III. HABITAT AND SPECIES DESCRIPTIONS

A. Flora III-2

1. Plant Community Types, Cottonwood Creek Unit III-5
2. Plant Community Types, Balls Ferry Wetland Unit 1 ..... III-15
3. Plant Community Types, Balls Ferry Wetland Unit 2 ..... III-23

B. Fauna III-26

C. Endangered, Threatened and Rare Species III-29

1. Special Status Plants III-29
2. Special Status Wildlife III-40

III. HABITAT AND SPECIES DESCRIPTIONS

The Mouth of Cottonwood Creek Wildlife Area can be grouped into eight basic plant community types consisting of at least 220 plant species, including 117 non-native or naturalized species. The Wildlife Area provides suitable habitat for 25 species of fish, 15 species of reptiles and amphibians, 201 species of birds, and 45 species of mammals. To date, 2 rare plants and 29 special-status animal species have been documented on the site.

A. Flora

Vegetation Communities, Habitat Types and Plant Species

METHODOLOGY

Habitat and plant species descriptions are based upon reconnaissance-level field surveys as well as a review of published and unpublished reports covering the Mouth of Cottonwood Creek Wildlife Area (MCCWA). The objectives of the surveys included:

- Compiling an inventory of vascular plant species growing without cultivation in the study area
- Characterizing the habitat types (plant communities) occurring in the study area
- Locating and mapping occurrences of special-status plant species occurring in the study area
- Identifying and mapping sensitive habitats within the study area

Literature Review. Botanists reviewed literature and special-status species databases to identify special-status plant species and sensitive habitat types with potential to occur in the study areas (R. Buck, EcoSystems West for SEI, unpublished report). Sources included the California Natural Diversity Data Base (CNDDB) occurrence records for the Balls Ferry U.S. Geological Survey (USGS) 7.5' quadrangle and the eight quadrangles surrounding it (USFWS 2006a, 2008); county and USGS quadrangle occurrence records in the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California (Tibor 2001, CNPS 2006) for the same nine quadrangles; and regional floras (Munz and Keck 1973, Hickman 1993). They also reviewed the results of a botanical survey of the Cottonwood Creek Unit (excluding the mitigation area) conducted in 1993 and 1994 (Hubbell and Marr 1994).

Scientific nomenclature for plants in this report follows Hickman (1993), Tibor (2001), and CNPS (2006). Common names follow Abrams (1923-1960), Hickman (1993), and the U.S. Department of Agriculture (USDA) PLANTS database (USDA 2006), except for special-status species, which follow Tibor (2001) and CNPS (2006) and *Ludwigia* species, which partially follow California Invasive Plant Council (2006).

Habitat types considered sensitive include those listed on the CNDDB working list of "high priority" habitats for inventory (i.e., those habitats that are rare or endangered within the borders of California) (Holland 1986, CDFG 2003a). Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species and California Department of Fish and Game (CDFG) Species of Special Concern, areas of high biological diversity, areas providing important wildlife habitat, and unusual or regionally restricted habitat types.

Field Survey and Plant Community Mapping. A reconnaissance-level botanical survey of the Cottonwood Creek and Balls Ferry Wetland Unit 1 was conducted on 31 May – 2 June 2006. A representative cross-section of all habitat types within each unit was surveyed on foot. Relatively more field time was concentrated on areas providing suitable habitat for special-status plants known to occur in the vicinity. Additional reconnaissance was conducted by vehicle where access was available.

All vascular plant species encountered in identifiable condition were keyed to species or infraspecific taxon were identified using keys and descriptions in Munz and Keck (1973) and Hickman (1993). All habitat types occurring on the units were characterized and data was recorded on physiognomy, dominant

and characteristic species, topographic position, slope, aspect, substrate conditions, hydrologic regime, and evident disturbance for each habitat type. The generalized plant community classification schemes of Holland (1986), Sawyer and Keeler-Wolf (1995), and CDFG (2003a) were consulted in classifying the habitat types. The final classification and characterization of the habitat types of each unit were based on field observations (Buck, unpublished report).

In June 2009, biologists conducted a site visit to characterize and map the general habitat types on the Balls Ferry Wetland Unit 2. The plant community associations were described previously, so no detailed surveys were conducted at that time.

FINDINGS

Based on the preliminary assessments, eight basic plant communities and at least 220 plant species occur at the MCCWA. Of the plant species, 117 (53%) are non-native or naturalized species. A crosswalk of MCCWA plant communities and other common vegetation community classifications is provided in Table III-a. This is followed by a discussion of plant community types and species as they occur on each of the units. A list of all vascular plant species identified during field surveys of the Cottonwood Creek Unit and the Balls Ferry Wetland Unit 1 is presented in Appendix B. Floristic level surveys of Balls Ferry Wetland Unit 2 are a management step-down action (VB1).

Table III-a. Crosswalk of Plant Community Types at the MCCWA

MCCWA Plant Communities	CC Unit[1]		BFW1/2 Units[2]		MCCWA Total (as mapped)[3]		CALFED MSCS NCCP Habitat Types[4]	CDFG, Holland Habitat Types[5]	Sawyer/ Keeler-Wolfe Habitat Series[6]
	Acres	%	Acres	%	Acres	%			
California Annual Grassland	113.3	22%	303.3	62%	416.6	41%	Grassland	Non-native grassland (42200) Valley needlegrass grassland (42110) Valley wildrye grassland (42140)	California annual grassland series Purple needlegrass series Creeping ryegrass series
Valley Oak Savanna	43.1	8%	6.8	1%	49.9	5%	none	Valley oak woodland (71130)	Valley oak series
Great Valley Mixed Riparian Forest	226.8	45%	18.5	4%	245.3	25%	Valley/ foothill riparian Valley riverine aquatic	Great Valley willow scrub (63410) Great Valley cottonwood riparian forest (61410) Great Valley mixed riparian forest (61420) Great Valley valley oak riparian forest (61430) Elderberry savanna (63430)	Mixed willow series Black willow series Fremont cottonwood series Mexican elderberry series Narrowleaf willow series Sandbar willow series Valley oak series
Floodplain	61.3	12%	0.0	0%	61.3	6%	Valley riverine aquatic	Riparian scrub (63000) Mule fat scrub (63310)	Mule fat series
Freshwater Emergent Wetland and Pond[7]	39.9	8%	123.5	25%	163.4	16%	Nontidal freshwater permanent emergent Managed seasonal wetland	Vernal marsh (52500) Coastal and valley freshwater marsh (52410) Cismontane alkali marsh (52310)	Bulrush-cattail series Saltgrass series Sedge series Spikerush series Mosquito fern series
Vernal Pool/ Swale/Seasonal Pond	0.0	0%	1.9	<1%	1.9	<1%	Natural seasonal wetland	Northern claypan vernal pool (44120)	Northern claypan vernal pool series
Seep	0.0	0%	0.8	<1%	0.8	<1%	none	Freshwater seep	none
Ruderal **(Himalayan Blackberry)** **(Developed)**	24.6 (24.6) (0.0)	5%	32.2 (26) (6.2)	7%	56.8 (50.6) (6.2)	6%	none	none	none

[1] Cottonwood Creek Unit

[2] Balls Ferry Wetland Units 1 and 2 combined

[3] The total mapped plant community acreage (1011 acres) is approximately 50 acres less than CDFG acquisition records. This discrepancy is due to the uncertain southern boundary of the Cottonwood Creek Unit.

[4] CALFED Multi-Species Conservation Strategy, Natural Community Conservation Plan (CALFED 2000b)

[5] CDFG 2003a, Holland 1986

[6] Sawyer and Keeler-Wolf 1995 (update to be published 2009)

[7] Freshwater emergent wetland includes natural and created wetlands, ponds, stream channels and ditches

1. Plant Community Types, Cottonwood Creek Unit

A total of 166 vascular plant taxa (species, subspecies and varieties) have been documented on the 550-acre Cottonwood Creek Unit. Of these, 74 taxa are native and 88 are non-native. It is not known whether 4 taxa recorded are native or non-native: cleavers (*Galium aparine*) and Kentucky bluegrass (*Poa pratensis*), because standard references disagree on whether or not these taxa are native to California; and horseweed (*Conyza* sp.) and tobacco (*Nicotiana* sp.), because these species could be identified only to genus, and both native and non-native species could occur in the area. A number of species could not be identified because the survey was conducted before their flowering period and plant parts necessary for identification (flowers and/or fruits) were not present. A lesser number of species, mostly annuals, were already past the stage when identification would have been possible. A list of all vascular plant species identified in the unit is presented in Appendix B.

Of the eight plant community types occurring at the MCCWA (Table III-a above), the following six are present on the Cottonwood Creek Unit:

- California annual grassland
- Valley oak savanna
- Great Valley mixed riparian forest (includes grassland-riparian savanna and riparian restoration)
- Floodplain
- Freshwater emergent wetland and pond (includes created freshwater marsh and pond)
- Ruderal (Himalayan blackberry)

California annual grassland and the closely related habitat types of valley oak savanna and grassland-riparian savanna form a mosaic over most of the lower terrace, except for those areas in closest proximity to Cottonwood Creek. California annual grassland and valley oak savanna occupy most of the upper terrace, except where ponds and freshwater wetlands have been artificially created as part of a mitigation bank. Freshwater wetlands occur locally in areas of suitable hydrology on both terraces. Areas adjacent to Cottonwood Creek (sometimes extending several hundred feet from the channel) where alluvial sediments are frequently reworked by flooding represent the floodplain habitat type. The ruderal habitat type is essentially defined by dominance of an invasive non-native species, Himalayan blackberry (*Rubus discolor*, or *R. armeniacus* according to some references); it occurs in a number of areas on the upper terrace. The distribution of these plant community types on the Cottonwood Creek Unit is shown in Figure III-a (topographic view) and Figure III-b (aerial view).

Figure III-a. Plant Community Types, Cottonwood Creek Unit, MCCWA (topographic view)

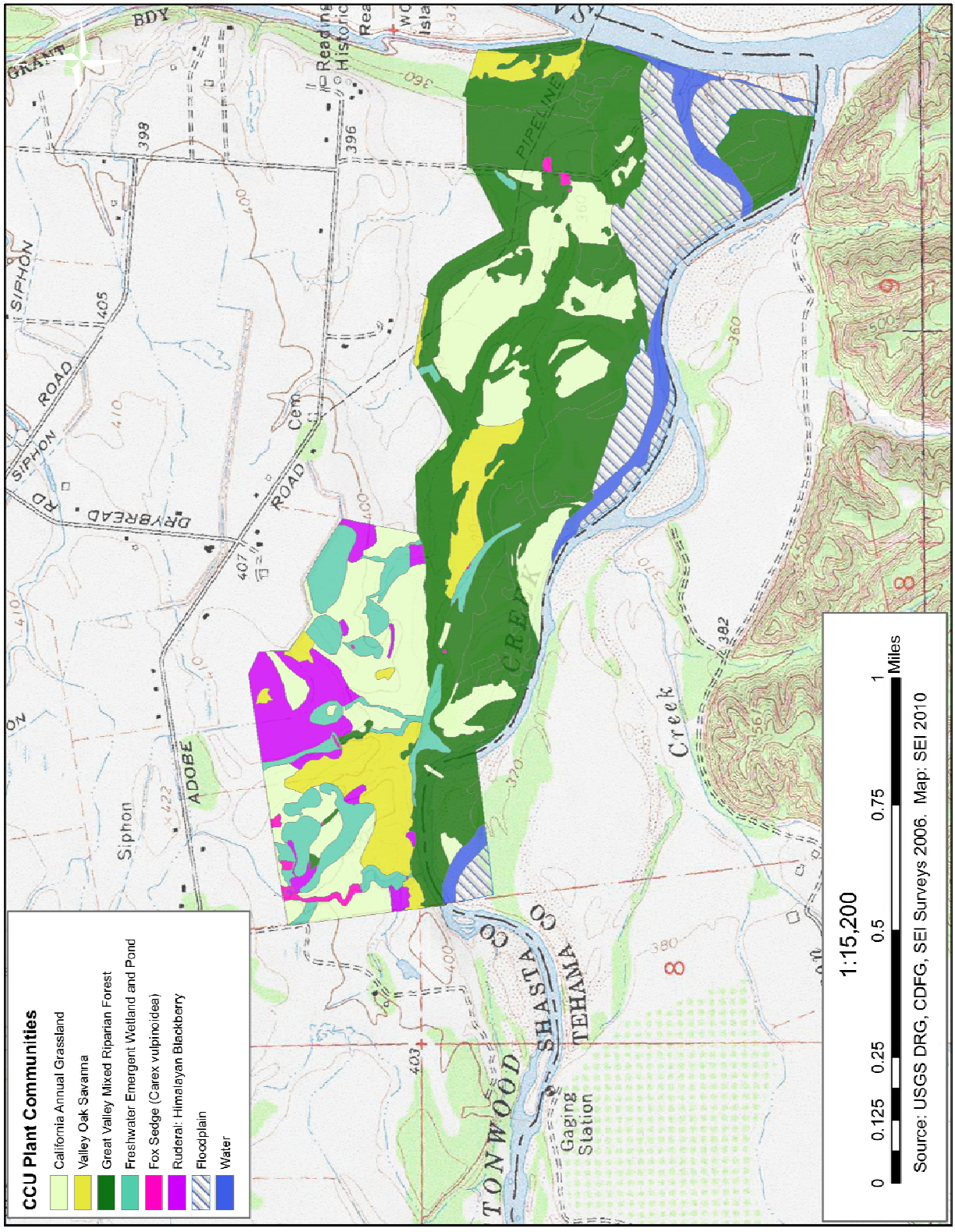
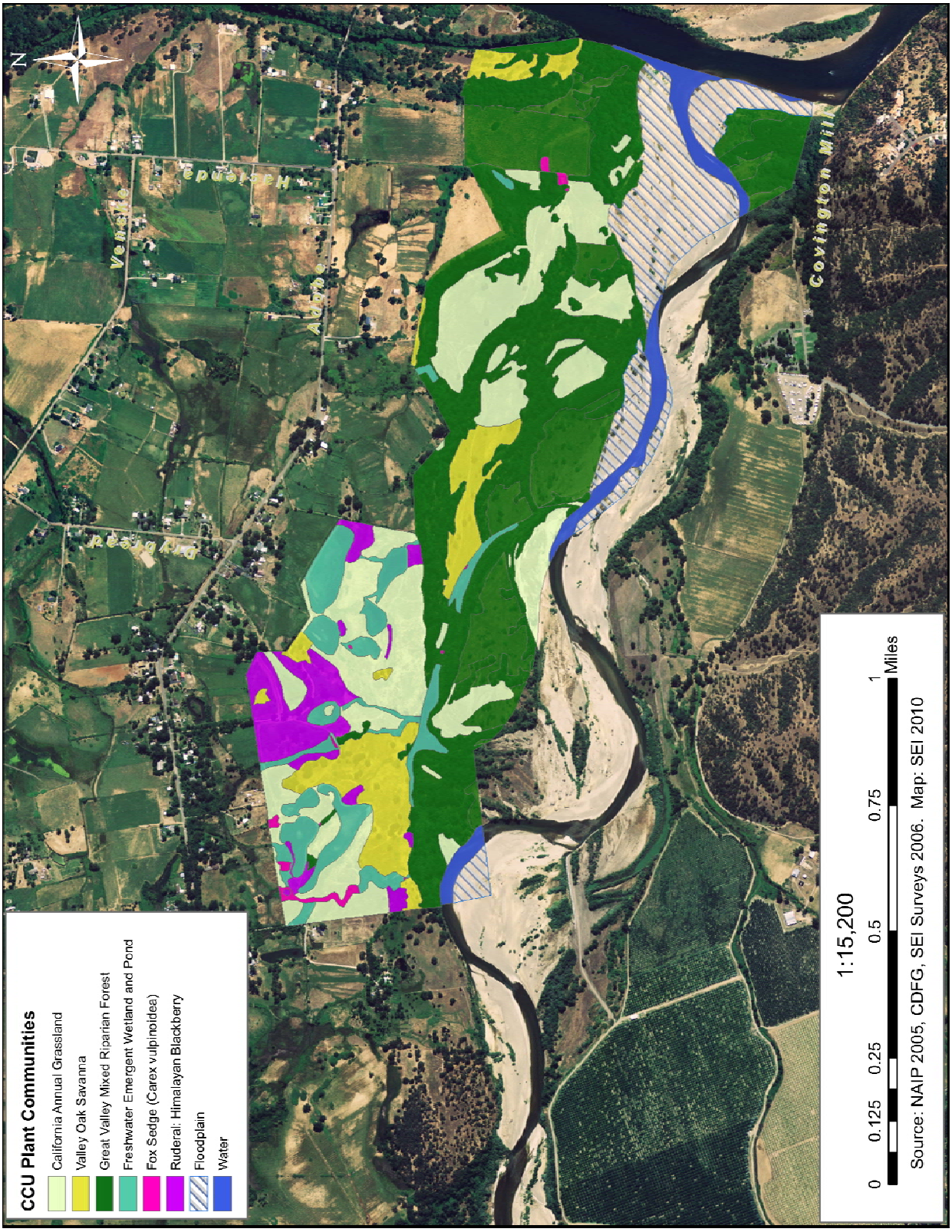


Figure III-b. Plant Community Types, Cottonwood Creek Unit, MCCWA (aerial view)



CALIFORNIA ANNUAL GRASSLAND

This habitat type is recognized as the California annual grassland alliance by CDFG (2003a) and as the California annual grassland series by Sawyer and Keeler-Wolf (1995). It corresponds to the non-native grassland habitat type of Holland (1986). California annual grassland is one of the most widespread habitat types in this unit, covering approximately 113 acres (22%). California annual grassland, along with the very similar habitat types of valley oak savanna and grassland-riparian savanna, occupy much of the upper terrace. They form a mosaic with Great Valley mixed riparian forest over most of the lower terrace; grassland and grassland-savanna occupy the slightly higher areas that have more well-drained soil, and riparian forest occupies the slightly lower areas that have less well-drained soil.

As would be expected for such a widespread habitat type, the grassland is quite heterogeneous in species composition from place to place. The cover is generally dense, often 100% or nearly so, and the grasses are mostly 2 to 4 feet tall. The dominant grasses are mostly annual and non-native, and at any given location include some combination of the following species: ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), Italian rye grass (*Lolium multiflorum*, sometimes a biennial), slender wild oat (*Avena barbata*), hare barley (*Hordeum murinum* ssp. *leporinum*), dogtail grass (*Cynosurus echinatus*), six-weeks fescue (*Vulpia bromoides*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and silver hairgrass (*Aira caryophyllea*). Another non-native annual grass, the highly invasive species Medusa head (*Taeniatherum caput-medusae*), is also locally dominant in sizable patches. Two non-native grasses, velvet grass (*Holcus lanatus*) and tall fescue (*Festuca arundinacea*), are sometimes dominant in relatively moist areas, although they generally do not occur together. Only one native grass, the rhizomatous perennial creeping wild rye (*Leymus triticoides*), is widespread, although not common, in this grassland.

PHOTO: California annual grassland along riparian corridor. July 2005, SEI.

A variety of herb species are associated with the grasses. Non-native species are generally more abundant than native species; they include English plantain (*Plantago lanceolata*), cut-leaved geranium (*Geranium dissectum*), purple vetch (*Vicia benghalensis*), yellow star-thistle (*Centaurea solstitialis*), prickly lettuce (*Lactuca serriola*), rose clover (*Trifolium hirtum*), lesser hawkbit (*Leontodon taraxacoides* ssp. *taraxacoides*), smooth cat's-ear (*Hypocharis glabra*), hairy cat's-ear (*Hypocharis radicata*), shamrock clover (*Trifolium dubium*), spreading hedge-parsley (*Torilis arvensis*), yellow salsify (*Tragopogon dubius*), short-fruit stork's bill (*Erodium brachycarpum*), jointed charlock (*Raphanus raphanistrum*), and, in relatively moist places, bird's-foot trefoil (*Lotus corniculatus*).

Some native species do occur in this grassland; characteristic, relatively widespread species include Spanish-clover (*Lotus purshianus*), wine cup clarkia (*Clarkia purpurea* ssp. *quadrivulnera*), wild hyacinth (*Dichelostemma multiflorum*), Hartweg's doll's-lily (*Odontostomum hartwegii*), harvest brodiaea (*Brodiaea elegans* ssp. *elegans*), Fitch's spikeweed (*Hemizonia fitchii*), marigold pincushion plant (*Navarretia tagetina*), dove weed (*Eremocarpus setigerus*), and western ragweed (*Ambrosia psilostachya*) (locally forming patches from rhizomes).

The invasive non-native woody vine Himalayan blackberry is also widespread in the grassland and grassland-savanna habitats on the site, locally forming dense patches. It often, but not always, occurs near the margins of riparian forest or freshwater marsh. Large areas more or less dominated by Himalayan blackberry were mapped as the ruderal/Himalayan blackberry habitat type, but smaller patches of this vine within grassland or valley oak savanna habitats were included with those habitat types.

VALLEY OAK SAVANNA

This habitat type is recognized as valley oak woodland by Holland (1986) and as the valley oak series by Sawyer and Keeler-Wolf (1995). Sizable areas on both the upper and lower terraces are occupied by annual grassland containing more or less widely scattered, mostly medium-sized to large trees of valley oak (*Quercus lobata*). These areas are mapped as the valley oak savanna habitat type; they cover approximately 43 acres (8%) of the Cottonwood Creek Unit. The grass and herb composition of this habitat type is essentially identical to that of the California annual grassland.

GREAT VALLEY MIXED RIPARIAN FOREST

This habitat type is recognized as Great Valley mixed riparian forest by Holland (1986) and CDFG (2003a). Depending on the dominant tree species, portions of this riparian forest may also correspond to the following alliances recognized by CDFG (2003a): Fremont cottonwood riparian forests and woodlands; arroyo willow riparian forests and woodlands; black willow riparian forests and woodlands; red willow riparian forests; and mixed willow riparian forests and woodlands. In the classification scheme of Sawyer and Keeler-Wolf (1995), portions of this riparian forest may correspond to the Fremont cottonwood, black willow, mixed willow, or red willow series.

Great Valley mixed riparian forest is considered a CNDDB "high priority" habitat type due to its rarity in California (CDFG 2003a). It is the dominant habitat in the Cottonwood Creek Unit, covering approximately 227 acres (45%). As noted previously, Great Valley mixed riparian forest forms a mosaic with California annual grassland, valley oak savanna and grassland-riparian savanna over most of the unit's lower terrace, where the riparian forest typically occurs in relatively low-lying areas with relatively poorly drained soil. It typically occurs in long linear stands that may represent old channels of

Cottonwood Creek or that follow the courses of upland streams as they traverse the terrace. Some of these stands have watercourses with flowing water running more or less down the center; it is unclear if all of these are tributary streams or if some might be subsidiary flows from Cottonwood Creek. On the upper terrace, riparian forest occurs only as several small, isolated, perhaps early successional stands in the vicinity of some of the artificially created ponds and freshwater marshes.

PHOTO: Great Valley mixed riparian habitat near the mouth of Cottonwood Creek. July 2005, SEI

In general, the tree canopy in the riparian forest is typically closed or nearly so (90–100% cover). The dominant tree species include some combination of Fremont cottonwood (*Populus fremontii*), valley oak, and willows (*Salix* spp.). At least four species of willow were observed on the site: Gooding's black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), narrow-leaved willow (*Salix exigua*), and red willow (*Salix laevigata*), with the latter species seemingly less abundant than the other three. Gooding's black willow and red willow are often large trees, while arroyo willow and narrow-leaved willow are typically large, often arborescent shrubs. Two other native tree species, Oregon ash (*Fraxinus latifolia*) and box elder (*Acer negundo* ssp. *californicum*), are important constituents of the riparian forest at the eastern end of the site, with the latter species often quite large and among the canopy dominants. Neither species was observed elsewhere on the site.

Northern California black walnut (*Juglans californica* var. *hindsii*), a tree species not believed to be native to Shasta or any adjacent county (Hickman 1993, Tibor 2001, CNPS 2006), and therefore presumed to be naturalized on the site, is also widespread in the riparian forest. It often occurs as small trees in the understory, but large individuals also occur, indicating that it has been present on the site for a long time. Another non-native tree, southern catalpa (*Catalpa bignonioides*), has locally invaded the riparian forest in the southwestern portion of the site. The large native shrub (occasionally a small tree) southwestern elderberry (*Sambucus mexicana*), the host plant for the federally threatened insect valley

elderberry longhorn beetle (*Desmocerus californicus dimorphus*), is occasional but widespread around the margins of the riparian forest.

The understory in the riparian forest is quite variable. It is sometimes relatively open and dominated by herbaceous species such as the weedy non-native grass ripgut grass (*Bromus diandrus*), the native herb Douglas' mugwort (*Artemisia douglasiana*), and cleavers (*Galium aparine*), which may or may not be native. Santa Barbara sedge (*Carex barbarae*) forms patches of varying sizes in relatively moist, low-lying areas. In other areas, the riparian forest understory is dense, and often impenetrable, with numerous small trees and/or dense tangles of woody vines. The native vine California wild grape (*Vitis californica*) is widely distributed, sometimes forming large, dense patches. Another native vine, California pipe-vine (*Aristolochia californica*), is also widespread, although somewhat less extensive, in the riparian forest understory. California pipe-vine provides habitat for the pipevine swallowtail butterfly (*Battus philenor).* The invasive, aggressive non-native woody vine Himalayan blackberry is very widespread in the riparian forest understory (more so than either of the native vines), and often forms impenetrable tangles. Another non-native vine, the cultivated grape (*Vitis vinifera*) forms dense colonies at a number of widely scattered locations, but appears to be relatively localized.

Along and in the vicinity of flowing streams within the riparian forest, especially where the riparian forest canopy is relatively open, the riparian forest is transitional to the freshwater emergent wetland habitat type, and contains species characteristic of that plant community.

Grassland-Riparian Savanna. Approximately 46 acres (20%) of the Great Valley mixed riparian habitat are mapped as grassland-riparian savanna. These areas occur in the southern portion of the lower terrace in relatively close proximity to Cottonwood Creek where they are mostly surrounded by riparian forest. This habitat type may be regarded as transitional between California annual grassland and Great Valley mixed riparian forest, although periodic disturbance such as major flood events, fires or (past) grazing may be important in maintaining it. It is similar in physiognomy to the valley oak savanna habitat type with widely scattered trees within grassland, but the tree species are those characteristic of the Great Valley mixed riparian forest habitat, including Fremont cottonwood, Gooding's black willow, arroyo willow, valley oak, and Northern California black walnut.

Interestingly, valley oak is the predominant tree species in the patches of grassland-riparian savanna near the eastern boundary of the site in closest proximity to the Sacramento River and Reading Island. These patches of habitat are mapped as valley oak savanna, although they also contain other riparian tree species and are thus transitional to grassland-riparian savanna.

PHOTO: Grassland-riparian savanna along the PGE access road on Cottonwood Creek Unit. July 2005, SEI

PHOTO: Riparian restoration area on Cottonwood Creek Unit. July 2005, SEI

Riparian Restoration Site. A 26-acre area in the eastern portion of the Cottonwood Creek Unit on the east side of the eastern entrance road has been planted with scattered individuals of native trees and shrubs following disking or other tilling of the soil (Chico Research Foundation 2004, 2000). Species planted include box elder, mule fat *(Baccharis salicifolius)*, narrow-leaved willow, Oregon ash, and Fremont cottonwood. The intervening areas are vegetated largely with non-native grasses and other weedy species.

FLOODPLAIN

The floodplain habitat type is mapped at approximately 61 acres (12%) and includes the mostly barren areas along Cottonwood Creek that are extensively reworked by scour and flooding and therefore in a constant state of recolonization. Plant species generally include annual grasses, mule fat and arroyo willow. The area of this habitat type varies with flood events.

PHOTO: Cottonwood Creek floodplain. July 2005, SEI.

PHOTO: Cottonwood Creek floodplain. July 2005, SEI.

FRESHWATER EMERGENT WETLAND AND POND

The freshwater emergent wetland habitat type corresponds to the coastal and valley freshwater marsh habitat type of Holland (1986). Depending on the dominant emergent monocot(s), it may variously correspond to the bulrush, bulrush-cattail or cattail alliance (series) of Sawyer and Keeler-Wolf (1995) and CDFG (2003a), although some areas of freshwater wetlands do not fit in any of these alliances.

Freshwater emergent wetlands are not as large or as widespread on the Cottonwood Creek Unit as on either of the Balls Ferry wetland units, although a number of natural, or apparently natural, freshwater wetlands of various sizes occur on both the lower and upper terraces of the Cottonwood Creek Unit. On the lower terrace, this habitat occurs within or at the margins of riparian forest. Because the habitat signature is difficult to distinguish from that of riparian forest on aerial photos, additional areas besides those mapped may occur within the riparian forest. On the upper terrace, freshwater emergent wetland habitat occurs in association with drainages with at least some flowing water. To maintain consistency with the classification of habitats on the Balls Ferry wetland units, ponds are not recognized as distinct habitats from freshwater emergent wetland. On the Cottonwood Creek Unit, freshwater emergent wetland and pond habitats total approximately 40 acres (8%).

According to the broad-based classification schemes cited above, freshwater emergent wetlands are characterized by dominance, or at least presence, of large, tall emergent monocots such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.). All of the freshwater wetlands mapped on the Cottonwood Creek and both Balls Ferry units contain varying amounts of the large emergent monocots broad-leaved cattail (*Typha latifolia*) and/or viscid bulrush or tule (*Scirpus acutus* var. *occidentalis*). These species range from overwhelming dominants to present only in small, isolated colonies, with large intervening areas dominated by other, smaller species that are also highly moisture-dependent. All of the areas mapped as freshwater emergent wetland are characterized by permanent inundation; soils that are inundated or saturated for most of the season; or abundant soil moisture close enough to the surface to support highly moisture-dependent plant species.

Broad-leaved cattail is generally the predominant large emergent monocot in the freshwater wetland habitat of the Cottonwood Creek Unit, with viscid bulrush of more localized occurrence or absent. Other characteristic species of the freshwater marshes on the Cottonwood Creek Unit include: common rush (*Juncus effusus* var. *pacificus*, of which two apparently distinct forms occur); a fairly robust, caespitose grass with light green foliage which could not be identified because it was not in flower or fruit; eggbract sedge (*Carex ovalis*); water smartweed (*Polygonum punctatum*); sharp-fruited rush (*Juncus acuminatus*); and slender rush (*Juncus tenuis*). The special-status species fox sedge (*Carex vulpinoidea*) is widely scattered, but usually localized, in, or near the margins of, freshwater marsh habitats. One area of freshwater wetland, located in the northeast portion of the site, within riparian forest west of the restoration site, contains a considerable amount of the large non-native emergent monocot pale yellow iris (*Iris pseudacorus*). The large native shrub California rose (*Rosa californica*) often forms localized thickets along and near the margins of freshwater wetlands, although it is nowhere extensive. Himalayan blackberry also forms large, dense patches along the margins of freshwater wetlands (occasionally overgrowing California rose), and has invaded the interiors of the wetlands in a few locations.

Cottonwood Mitigation Bank. The 29-acre mitigation bank represents nearly three-quarters of the total wetland acreage on the Cottonwood Creek Unit. It consists of nine ponds and associated freshwater wetlands that have been artificially created on the upper terrace by excavation and damming. There tends to be a gradation between the open ponds, with little or no emergent vegetation, and permanently or seasonally inundated wetland areas. Vegetation cover in these marshes is generally lower than is typical for natural freshwater marshes on the site. Broad-leaved cattail occurs, at varying abundance, in all of these ponds and wetlands. Viscid bulrush is infrequent or absent. Sharp-fruited rush and pale spike-rush (*Eleocharis macrostachya*) are often relatively abundant; slender rush is less common, but is sometimes moderately abundant. The apparently native form of floating primrose-willow or creeping water-primrose (*Ludwigia peploides* ssp. *peploides*) occurs in varying abundance in some of these ponds and wetlands, and can form large, dense colonies. In portions of some of these features, the hydrology appears marginal for wetland plants; these areas are sometimes vegetated largely by upland species, especially weedy species. Large patches of Himalayan blackberry are frequent around the margins of these features, and this species sometimes invades drier areas within them.

RUDERAL

Himalayan Blackberry. The invasive non-native woody vine Himalayan blackberry forms large patches in many grassland and valley oak savanna areas and totals approximately 25 acres (5%) of the Cottonwood Creek Unit. In some areas, Himalayan blackberry dominates areas large enough that they are recognized as a separate habitat type. These areas appear to have supported grassland or valley oak savanna prior to invasion by Himalayan blackberry. By far the largest area of this habitat type, covering perhaps 10-15 acres, is located on the upper terrace of the Cottonwood Creek Unit on both sides of the western entrance road to the site. Smaller areas of Himalayan blackberry occur elsewhere on the upper terrace. Himalayan blackberry is abundant in and around the margins of riparian forest and freshwater wetlands on the lower terrace, and it also occurs locally in grassland and valley oak savanna habitats; however, no large areas of it occur on the lower terrace.

Ruderal/Himalayan blackberry habitat has virtually 100% cover over extensive areas, and few other plants grow intermixed. Small openings are vegetated by grassland-like vegetation in which weedy species predominate. Sapling and small tree-sized valley oaks are often relatively abundant in ruderal/Himalaya blackberry areas, indicating that this habitat may be favorable for valley oak reproduction, perhaps because the dense stands of prickly Himalayan blackberry are a deterrent to deer and other herbivores. The yellow-breasted chat, a California Species of Special Concern, is also known to preferentially nest in blackberry thickets (Ricketts and Kus 2000), thus potentially complicating management of this invasive plant.

PHOTO: Access trail ending in a thicket of Himalayan blackberry, Cottonwood Creek Unit. July 2005, SEI

2. Plant Community Types, Balls Ferry Wetland Unit 1

A total of 155 vascular plant taxa (species, subspecies, and varieties) have been documented on the 346-acre Balls Ferry Wetland Unit 1 (BFW1). Of these, 65 taxa are native and 89 are non-native. It is not known whether one species recorded, Kentucky bluegrass, is native or non-native (Buck, unpublished report). As with the Cottonwood Creek Unit, a number of species were present on this unit that could not be identified because of the timing of the survey. A list of all vascular plant species identified in the unit is presented in Appendix B.

Of the eight plant community types occurring on the MCCWA (Table III-a above), the following seven are present on BFW1:

- California annual grassland
- Valley oak savanna
- Great Valley mixed riparian forest
- Freshwater emergent wetland and pond
- Vernal pond/swale/seasonal pond
- Seep
- Ruderal (Himalayan blackberry and developed)

California annual grassland, with local areas of valley oak savanna, occupies most of the area east of the main north-south road, and more localized areas west of the road. Much of the area west of the road is occupied by an extensive freshwater emergent wetland complex; two artificial ponds, one with a large associated freshwater wetland, occur elsewhere on the site. Well-developed Great Valley mixed riparian forest is essentially confined to two areas on this unit. The vernal pond/swale, seep, and seasonal pond habitat types are specialized and localized habitat types on this unit. The streamside habitat type occurs along the east-draining creek at the south end of the site. Himalayan blackberry occurs at a number of locations on the site, mostly in the western portion. The ruderal/developed habitat type is essentially artificial and is used for areas occupied by buildings and associated landscaped or heavily disturbed areas. The distribution of these plant community types on the Balls Ferry wetland units is depicted in Figure III-c (topographic view) and Figure III-d (aerial view).

Figure III-c. Plant Community Types, Balls Ferry Wetland Units 1 and 2, MCCWA (topographic view)

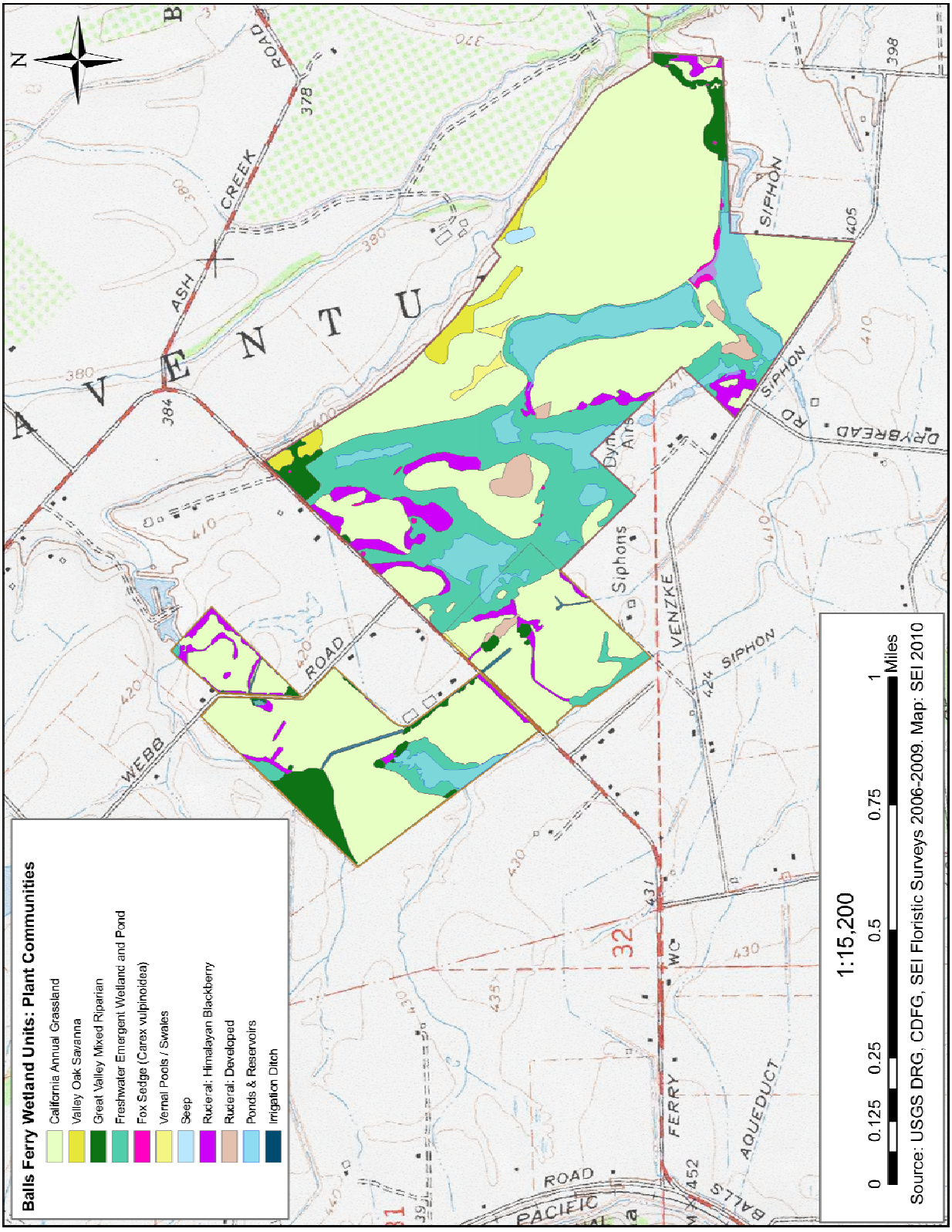
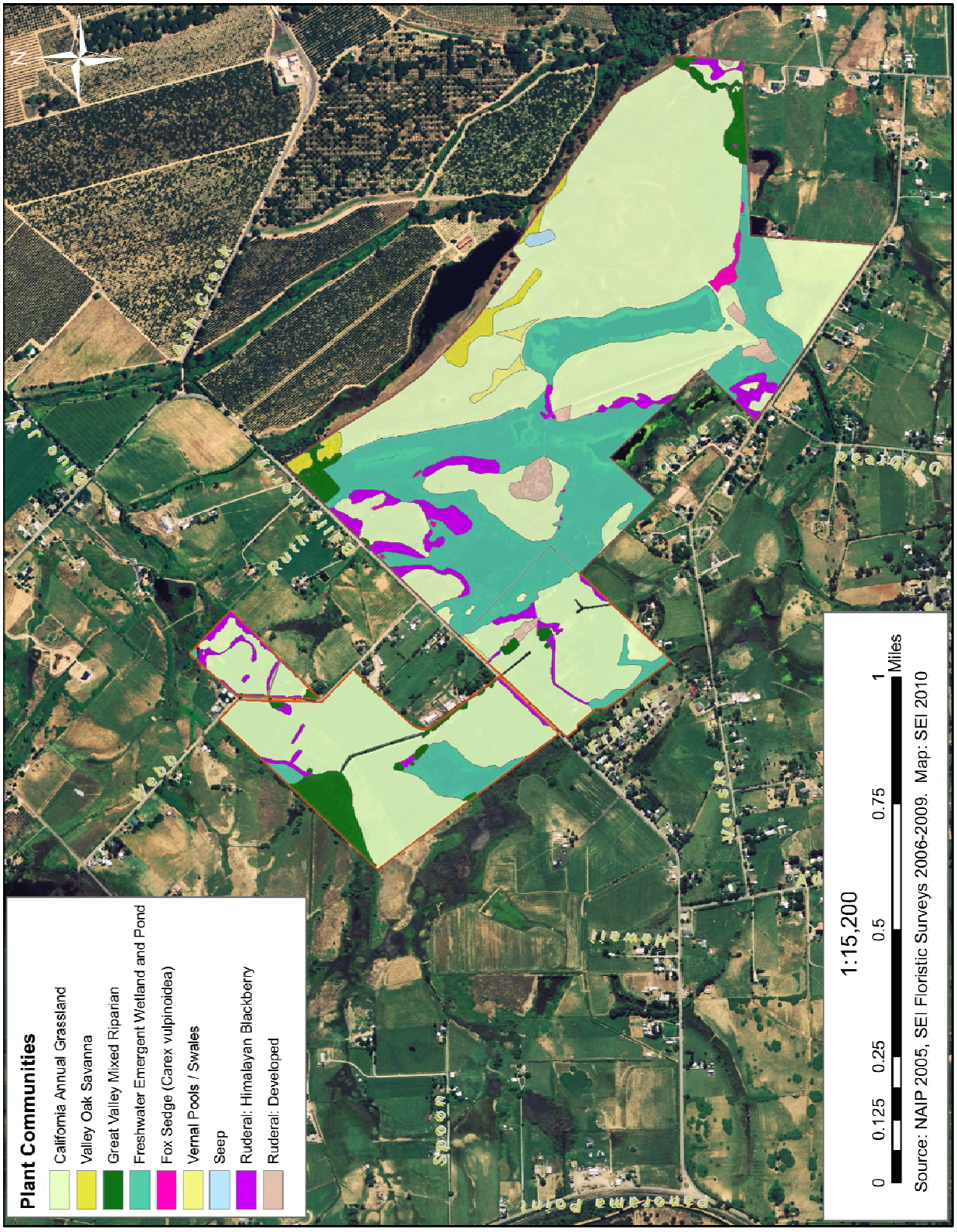


Figure III-d. Plant Community Types, Balls Ferry Wetland Units 1 and 2, MCCWA (aerial view)



CALIFORNIA ANNUAL GRASSLAND

PHOTO: East side panorama of California annual grassland habitat on BFW1. July 2005, SEI.

California annual grassland occurs on over half of BFW1, covering nearly 200 acres (58%) of the unit. This habitat type occupies most of the unit east of the main north-south road, and also occurs in relatively elevated areas west of the road. The grassland is generally similar to the California annual grassland on the Cottonwood Creek Unit, although the vegetation cover is generally lower (6 inches to 2 feet) and sometimes somewhat sparser where it is actively grazed. A similar suite of non-native grasses dominates the grasslands of this unit, including slender wild oat, soft chess, ripgut grass, six-weeks fescue, Medusahead (typically in dense colonies), Italian rye grass, hare barley, Mediterranean barley, and silver hairgrass. Velvet grass is sometimes a dominant in relatively moist, low-lying areas.

Non-natives tend to predominate among the herb associates; these include purple vetch, smooth cat's-ear, jointed charlock, rose clover, lesser hawkbit, yellow star-thistle, bindweed (*Convolvulus arvensis*), subterranean clover (*Trifolium subterraneum*), hairy pink (*Petrorhagia dubia*), Queen Anne's lace (*Daucus carota*), and, especially in relatively moist places, bird's-foot trefoil and yellow parentucellia (*Parentucellia viscosa*). Native herbs also occur in this grassland; widespread and characteristic species include Fitch's spikeweed, Spanish-clover, wild hyacinth, crown brodiaea (*Brodiaea coronaria* ssp. *coronaria*), Hartweg's doll's-lily, wine cup clarkia, and marigold pincushion plant. It is noteworthy that crown brodiaea was the only brodiaea species observed on BFW1, while harvest brodiaea was the only brodiaea species observed on the Cottonwood Creek Unit.

VALLEY OAK SAVANNA

Small areas in the eastern and northern portions of the BFW1, totaling less than 7 acres (2%) of the unit, support widely scattered, mostly large valley oaks and are mapped as valley oak savanna. As on the Cottonwood Creek Unit, the vegetation between the valley oaks is essentially California annual grassland.

GREAT VALLEY MIXED RIPARIAN FOREST

Riparian tree species frequently occur as solitary individuals or in small stands at the margins of freshwater wetland habitats on BFW1 and some of these, particularly in the northern portion, are extensive enough that they could be mapped as small areas of Great Valley mixed riparian forest. Only two areas of this habitat type, one in the extreme southeastern portion of the unit and one at the extreme northern end, occur in the unit, accounting for less than 8 acres (2%) of the unit in total. Extensive, well-developed areas of riparian forest like those on the Cottonwood Creek Unit do not occur on the BFW1.

The southern stand of riparian forest is developed along and adjacent to the main creek that drains from the site eastward. Gooding's black willow is the principal dominant tree in this stand. Associated tree (or arborescent shrub) species include Fremont cottonwood, arroyo willow, and valley oak. The tree canopy is relatively dense, especially in the eastern portion of this stand, but is locally somewhat open along and near the stream. These areas have relatively dense herb cover, including an unidentified light green caespitose grass (the same species that occurs in freshwater marshes on the Cottonwood Creek Unit; the native species water smartweed and common rush, and the non-native species bird's-foot trefoil, green dock

(*Rumex conglomeratus*), pennyroyal (*Mentha pulegium*), and chain speedwell (*Veronica catenata*). The bordering slopes, which also support riparian forest overstory, are heavily overgrown with Himalayan blackberry. Lesser amounts of another non-native vine, cultivated grape, are also present. This riparian stand is best developed in its eastern portion, where it is continuous with a much larger area of riparian forest located just off the site. Westward, the tree canopy becomes more open and discontinuous, and the proportion of valley oak in the canopy increases.

The northern riparian forest stand is on both sides of the main north-south road at and south of the north entrance to the site. Fremont cottonwood, Gooding's black willow arroyo willow, valley oak, and possibly red willow all occur in the tree canopy in this area. Several non-native trees and large, arborescent shrubs also occur in this riparian forest; these include silk tree (*Albizia* sp.), firethorn (*Pyracantha angustifolia*), plum (*Prunus* sp.), and others. Past disturbance, including construction of the road and irrigation ditch, may have facilitated the invasion of these species. East of the road, the riparian forest is locally dominated by valley oak, and Himalayan blackberry is very abundant in the understory. West of the road, there is considerable standing water and saturated soil; the hydrology in this area has been altered by construction of an irrigation ditch. The understory is nearly impenetrable here, with thickets of California rose and Himalayan blackberry, numerous small trees, and scattered patches of broad-leaved cattail.

FRESHWATER EMERGENT WETLAND AND POND

Nearly 107 acres (31%) of BFW1 is occupied by freshwater emergent wetland and pond. Freshwater emergent wetlands are among the most productive wildlife habitats in California. They provide food, cover and water for more than 160 species of birds and numerous mammals, reptiles and amphibians (Mayer and Laudenslayer 1988).

No distinction is made here between pond and freshwater wetland habitats because there is a very gradual, continuous transition from open water through permanently inundated areas with increasing density of emergent vegetation to areas that are not permanently inundated, but support large emergent monocots or other highly moisture-dependent species. However, except for marginal areas, most areas of freshwater wetlands on this unit appear to be permanently inundated, or nearly so, to varying depths.

The area west of the unit's main north-south road is a complex of interconnected freshwater marsh areas, including a number of ponds that locally extend west onto BFW2. These wetland areas are interspersed with several elevated areas that support grassland and Himalayan blackberry/ruderal habitats. All or some of the ponds in this area may be natural features. East of the north-south road, approximately in the center of the unit, there is a large north-south oriented artificial pond. This is hydrologically connected to the marsh/pond complex west of the road, receiving inflow from the complex at its northern end. To the south, both this pond and the large marsh/pond complex drain into another east-west oriented artificial pond (with bordering freshwater marsh areas) at the south end of the site, created by a dam on the main east-draining creek.

PHOTO: Panorama of large north-south oriented artificial pond in center of BFW1, looking west.

In contrast to the Cottonwood Creek Unit where broad-leaved cattail is the predominant large emergent monocot in freshwater marshes, on BFW1, both broad-leaved cattail and viscid bulrush are dominants over extensive areas of marsh. Generally, only one species or the other is present but in some localized areas they share dominance. Their cover ranges from sparse to often very dense and more or less impenetrable. Associated species include common rush (as on the Cottonwood Creek Unit, two apparently distinct forms occur); the glabrous (apparently) native form of floating primrose-willow (creeping water-primrose), often forming large colonies; sharp-fruited rush; pale spike-rush; water smartweed; eggbract sedge; slender rush; and fox sedge, at least locally around margins. The small floating fern Pacific mosquito fern (*Azolla filiculoides*) is relatively abundant in the southernmost pond (on the east-west creek).

Around the margins of most of the ponds, and locally in marsh areas with deeper water, there are dense colonies of a species tentatively identified as the non-native, invasive, pubescent form of floating primrose-willow (creeping water-primrose) (*Ludwigia peploides* ssp. *montevidensis*), often intermixed with the native form. This plant sometimes grows more or less erect (in contrast to the native form, which is always more or less prostrate and floating or creeping on drying mud) and has larger flowers than the native form. It could therefore be Uruguay water-primrose (*Ludwigia hexapetala*), a species previously known in California only from coastal counties. Uruguay water-primrose is also non-native and invasive (California Invasive Plant Council 2006).

Individuals or clumps of riparian tree species, including Fremont cottonwood, willows, valley oak, and, in one area, the non-native species white poplar (*Populus alba*) often occur along and near the margins of freshwater marsh areas, most abundantly toward the northern end of the unit. As on the Cottonwood Creek Unit, California rose often forms localized, although generally not extensive, thickets along the margins of freshwater marshes. Himalayan blackberry is also locally abundant in large patches along the margins of the wetlands; in a few locations, it has expanded into the interiors of the wetlands.

The channel of the east-west stream and the immediate bordering area between the artificial pond (the southernmost pond on the site) and the upper end of the riparian forest stand in the southeastern corner of the site share characteristics of freshwater wetland habitat, and so are included in this discussion. The gradient of this stream is relatively high, and well-developed freshwater marsh habitat is not developed along it, but there is a narrow zone dominated by moisture-dependent species. The native species floating primrose-willow (native form) and Pacific mosquito fern occur in the channel, along with the non-native (and potentially invasive) aquatic species parrotfeather (*Myriophyllum aquaticum*). Species occurring along the margins of the stream include the native species common rush, water smartweed, seep monkeyflower, and (in localized patches), narrow-leaved cattail (*Typha angustifolia*); and the non-native species pennyroyal and water speedwell (*Veronica anagallis-aquatica*).

VERNAL POND / SWALE / SEASONAL POND

In the classification scheme of CDFG (2003a), the habitat type to which the vernal pond/swale habitat type seems to have the closest affinity, northern hardpan vernal pools, is also a CNDDB “high priority” habitat type, and vernal pools and similar vernally inundated habitats are generally considered sensitive habitats. On BFW1, this plant community is approximately 1.9 acres (0.6%) of the unit. North of the large central pond there are two elongated low-lying areas that are inundated during early season, and then dry out completely in the spring. These areas support a distinctive assemblage of mostly native species characteristic of vernal pools and similar ephemerally wet habitats. They may be considered as vernal ponds or vernal swales. They may be referable to, or have affinities with, the northern hardpan vernal

pool habitat type of Holland (1986), Sawyer and Keeler-Wolf (1995), and CDFG (2003a), although they do not occur on soils typical of that habitat type.

Vegetation cover on the bottoms of these vernal ponds/swales is generally moderate. It consists of mostly native species including: stalked popcorn-flower (*Plagiobothrys stipitatus* var. *micranthus*); Great Valley eryngo (*Eryngium castrense*); dense-flower willow-herb (*Epilobium densiflorum*); dwarf woolly heads (*Psilocarphus brevissimus* var. *brevissimus*); white-flowered navarretia (*Navarretia leucocephala* ssp. *leucocephala*); Carter's buttercup (*Ranunculus bonariensis* var. *trisepalus*); dove weed (germinating after the soil is dry); annual hairgrass (*Deschampsia danthonioides*, mostly around margins); and, sparingly, Sacramento mesa mint (*Pogogyne zizyphoroides*). Most of these species are considered indicator species of vernal pools and similar vernally wet habitats. The non-native species pennyroyal is also moderately abundant in these ponds/swales.

Seasonal Pond. Near the southwest corner of the large artificial pond in the center of the unit, west of a barn in this vicinity, there is a small but fairly deep pond that mostly dries out in late season, although the deepest part may contain water permanently. This pond could be of artificial origin, and it is currently heavily disturbed by cattle grazing and trampling. It supports an assemblage of mostly native species, however. The native aquatic herb diverse-leaved pondweed (*Potamogeton diversifolius*) grows in the water. There is considerable pale spike-rush around the margins, and, at the outer margins, considerable pennyroyal. The dry bed is locally almost bare, but also supports native species characteristic of vernally wet habitats, including stalked popcorn-flower, Hoover's downingia (*Downingia bella*), smooth lasthenia (*Lasthenia glaberrima*), and bractless hedge-hyssop (*Gratiola ebracteata*).

PHOTO: Seasonal pond near the southwest corner of the large artificial pond on BFW1.

SEEP

Two small areas on BFW1 have moist to saturated soil but do not support large emergent monocots. These areas are here recognized as the seep habitat type. This habitat type is referable to the broadly defined freshwater seep habitat type (alliance) of Holland (1986) and CDFG (2003a). There is no comparable type in the classification scheme of Sawyer and Keeler-Wolf (1995). This plant community totals 0.8 acres (0.2%) of the unit.

One seep area is located along a small drainage in the extreme southeast corner of the site, south of the east-west stream. This area supports an assemblage of more or less moisture-dependent native and non-native species. Native species include fox sedge and slender rush; non-native species include green dock, velvet grass, pennyroyal, and meadow fescue (*Festuca pratensis*).

The other, larger seep area is located near the eastern site boundary in the east-central portion of the site. This seep is also vegetated with a combination of native and non-native species, but is more diverse than the southern seep. Native species in this seep area include pale spike-rush, seep monkeyflower (*Mimulus guttatus*), slender rush, water smartweed, Great Valley eryngo, and, in a large, dense patch near the margin, white-tipped clover (*Trifolium variegatum*); non-native species include velvet grass, pennyroyal, waxy manna grass (*Glyceria declinata*), and, around the margins, shamrock clover and yellow parentucellia.

RUDERAL

Himalayan Blackberry. As on the Cottonwood Creek Unit, there are areas more or less dominated by Himalayan blackberry on BFW1 that are large enough to be mapped as Himalayan blackberry/ruderal habitat. Most of these areas are located west of the main north-south road, in between California annual grassland and freshwater marsh habitats. A small area of Himalayan blackberry/ruderal habitat also occurs at the extreme southeast corner of the unit. Approximately 15 acres (4%) of BFW1 are mapped as Himalayan blackberry.

Developed. Two areas with residences and associated outbuildings are located on BFW1, one near the south entrance and one in the west-central portion. A barn and associated corral area, heavily trampled by cattle, are located in the southern portion of the area, and another barn (formerly an airplane hangar) is located in the central portion. These areas are recognized as a developed/ruderal habitat type. Where not occupied by buildings, the vicinity of the residences consists primarily of landscaped areas or heavily disturbed areas. Vegetation, other than landscaping species, within the developed/ruderal areas consists mainly of weedy species. Approximately 5.5 acres (1%) of BFW1 has been developed.

3. Plant Community Types, Balls Ferry Wetland Unit 2

In June 2009, biologists conducted a site visit of the newly acquired 141-acre Balls Ferry Wetland Unit 2 (BFW2) to assess general habitat conditions and map plant community types. Due to its immediate proximity to BFW1, plant community assemblages were assumed to be similar to those documented on BFW1. A focused survey for special-status plants and the preparation of a formal plant list is recommended under step-down actions in the Operation and Maintenance section (VB1).

Of the eight plant community types that occur on the other two units of the MCCWA, four were documented on BFW2:

- California annual grassland
- Great Valley mixed riparian
- Freshwater emergent wetland and pond
- Ruderal (Himalayan blackberry and disturbed)

The distribution of these plant communities in BFW2 is depicted together with BFW1 in Figure III-c (topographic view) and Figure III-d (aerial view).

CALIFORNIA ANNUAL GRASSLAND

PHOTO: California annual grassland on the east side of BFW2. 2009, SEI

California annual grassland is the primary habitat type on BFW2, comprising approximately 106 acres (67%) of the unit. The grasslands of BFW2 are used for hay production and grazing, and are predominately composed of non-native grasses similar to those found on the adjacent BFW1.

GREAT VALLEY MIXED RIPARIAN FOREST

PHOTO: Dense mixed valley riparian along northern boundary of BFW2. ACID ditch on right.

Individuals or clumps of riparian tree species, including Fremont cottonwood, willows, and valley oaks occur in scattered locations along the property boundary and a fairly well developed mixed riparian woodland is located in the northwestern portion of BFW2 in association with the ACID irrigation system. In this stand, black willow is the principal dominant tree with Fremont cottonwood, arroyo willow, and valley oak. The tree canopy and understory are relatively dense. This habitat type covers approximately 10 acres (7%) of the unit.

FRESHWATER EMERGENT WETLAND AND POND

PHOTO: Dense tules and freshwater wetland on west side of BFW2, extending beyond parcel boundary. 2009, SEI

PHOTO: Freshwater wetland on east side of BFW2 that is contiguous with large complex of interconnected freshwater marsh areas and ponds on BFW1. 2009, SEI

Freshwater emergent wetland and pond is the second most prevalent habitat type on BFW2, comprising approximately 16.5 acres (12%) of the unit. As discussed previously, no habitat type distinction is made between pond and freshwater wetland habitats because there is a very gradual, continuous transition from open water through permanently inundated areas with increasing density of emergent vegetation to areas that are not permanently inundated, but support large emergent monocots or other highly moisture-dependent species. The larger ponds appear to be natural features, while some smaller ponds seem to be artifacts of the ACID irrigation system. The predominant species include broad-leaved cattail and viscid bulrush around the margins and in shallower areas of the wetlands. Along the northern boundary of BFW2 (west of Webb Road, and in the northeastern corner, east of Webb Road), there are a series of small ponds that support dense colonies of a species tentatively identified as the non-native, invasive, floating primrose-willow (creeping water-primrose). The wetland in the easternmost corner of BFW2 (south of Balls Ferry Road) is contiguous with the large complex of interconnected freshwater marsh areas and ponds that lies west of the main north-south road in BFW1.

RUDERAL

The remainder of the habitat types on the BFW2 are classified as ruderal, either Himalayan blackberry or developed. Himalayan blackberry grows in large mounds along the property boundaries and is interspersed throughout the three parcels that comprise BFW2. It is distinct enough to warrant classification as a unique habitat and represents approximately 11 acres (8%) of the total acreage of BFW2. Developed lands include those areas previously disturbed by human development. Only 0.77 acres (<1%) of this unit are mapped as developed.

B. Fauna

METHODOLOGY

Wildlife species descriptions are based upon review of published and unpublished reports covering the MCCWA as well as reconnaissance-level field surveys. The objectives for this work included:

- Compiling an inventory of common wildlife species found in the study area
- Evaluating habitat quality for wildlife species
- Developing a list of special-status wildlife species potentially occurring in the study area
- Identifying and mapping sensitive wildlife habitats within the study area

Literature Review. Wildlife biologists conducted a review of published literature and unpublished materials (including Internet research and CDFG internal documents) concerning the wildlife resources at the MCCWA. They reviewed the results of previous wildlife surveys conducted in and near the MCCWA (Richardson et al. 1979) and other sources, including the CNDDB occurrence records for the Balls Ferry USGS 7.5' quadrangle and the eight quadrangles surrounding it (CDFG 2006a, b, 2009), Threatened and Endangered Species Records for Shasta and Tehama counties (USFWS 2006b, c, 2008), and the California Wildlife Habitats Relationships System (CDFG 2006b, 2009). They also consulted with local and regional species experts.

Field Surveys. Biologists conducted reconnaissance-level field surveys to assess potential habitat for both common and special-status wildlife species in 2005 and 2006 (SEI, unpublished data). Reconnaissance surveys consisted of pedestrian transects to visually inspect the variety and quality of wildlife habitat as well as "windshield surveys" where access allowed. Biologists noted general habitat conditions and observations of all wildlife species encountered. Wildlife species were identified by sight, sound, tracks and scat.

FINDINGS

Based upon this preliminary assessment, a total of 25 species of fish, 15 species of reptiles and amphibians, 201 species of birds, and 45 species of mammals may utilize habitats found at the MCCWA (Appendix C). There are no data for invertebrate species occurrences. Of the higher taxa, 29 are considered special-status species by either CDFG or USFWS.

Invertebrates

Invertebrates include aquatic insects, freshwater crustaceans (e.g., amphipods, crayfish), aquatic annelids (worms), zooplankton, and immature stages of certain terrestrial insects (e.g., *Lepidoptera*) that occur mainly in wetlands. The host plant (valley elderberry) for the federally threatened valley elderberry longhorn beetle is present in scattered locations throughout the MCCWA. Based upon documentation from nearby Reading Island (CDFG 2006a), the beetle is likely to be found on site. The Cottonwood Creek Unit is known for its diversity of dragonflies (*Odonata* spp.) (Bruun 2005) as well as the beautiful pipe-vine swallowtail butterfly (*Battus philenor*) (Cull, unpublished field observation). No focused

invertebrate surveys have been conducted, and there is much to be learned about the diversity of the aquatic and terrestrial invertebrates at this site.

Fish

Cottonwood Creek provides habitat for a variety of anadromous and resident fish species including fall-run and spring-run Chinook salmon *(Onchorhyncus tshawytscha*), steelhead (*O. mykiss*), California roach (*Hesperoleucus symmetricus*), hardhead (*Mylopharodon concephalus*), and a wide variety of introduced species, including mosquito fish (*Gambusia affinis*), bass (*Micropterus* spp,), and white catfish (*Ictalurus catus*). CDFG surveys detected over 25 fish species that utilize Cottonwood Creek and its tributaries (Richardson et al. 1979). Sport fishing occurs along the mainstem of Cottonwood Creek and its upper tributaries, primarily for warm water species such as small mouth bass (CH2MHill 2002). The ponds at the BFW1 support a thriving catfish population and are likely to have been stocked with large-mouth bass (S. Arrison, CDFG retired, personal communication). To date, no focused fishery assessment has been conducted at either of the Balls Ferry wetland units.

Amphibians

This region of the Central Valley and Shasta County provides suitable habitat for 8 species of amphibians, including 3 salamanders and 5 frogs (CalHerps 2006, 2009). The MCCWA is within the historical range of California red-legged frog (*Rana draytonii*), but they are considered to be extirpated from the valley floor (Jennings and Hayes 1994). The Cottonwood Creek watershed has been targeted as a potential recovery site for this species (USFWS 2002 and 2006d). The natural and artificial wetland habitats at both units support large populations of bullfrogs (R. Cull, unpublished field observation).

Reptiles

No focused inventory of reptiles has been conducted in the area. Based upon a review of ranges in California and the types of habitat types present at the MCCWA, common reptiles are likely to include western fence lizard (*Sceloperus occidentalis*), northern alligator lizard (*Elgaria coerulea*), western skink *(Eumeces skiltonianus),* Pacific rattlesnake (*Crotalus oreganos),* terrestrial garter snake (*Thamnophis sirtalis fitchi),* and Pacific gopher snake (*Pituophis catenifer catenifer)* (CalHerps 2006, 2009).

Birds

Water Birds

Managed and naturally occurring seasonal wetlands with complex diverse topography provide critical foraging, nesting, and loafing habitat for an abundance of shorebirds, waders and waterfowl bird species. Maintaining existing and restoring additional suitable seasonal and permanent wetland, and riparian communities, and reducing the effect of factors that can suppress breeding success in the Wildlife Area is critical to maintaining healthy shorebird and wading bird populations in the region. Some of the waders

observed at the MCCWA include American bittern (*Botaurus lentiginosus*), green heron (*Butorides virescens*), snowy egret (*Egretta thula*), and great blue heron (*Ardea herodias*).

Waterfowl populations are a highly valued and diversified biological resource. They are of high interest to a variety of recreational users of the Wildlife Area, particularly hunters and bird watchers. Fifteen waterfowl species have been observed on site, including common species such as Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), and mallard (*Anas platyrhynchos*).

Raptors

A wide variety of wintering and/or breeding raptors utilize the MCCWA, including bald eagle, osprey, red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk *(Buteo lineatus*), Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), peregrine falcon (*Falco peregrinus anatum*), kestrel (*Falco sparverius*), Cooper's hawk (*Accipter cooperii*), sharp-shinned hawk (*Accipiter striatus*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), and northern harrier (*Circus cyaneus*).

Terrestrial Birds

The primary upland game bird species that utilize the Wildlife Area are mourning dove (*Zenaida macroura*), wild turkey (*Meleagris gallopavo*), and ring-neck pheasant (*Phasianus colchicus*).

Passerines

Neotropical migratory birds are species that breed in North America and winter in Central and South America. Representative species that breed and/or migrate through the Wildlife Area include western kingbird (*Tyrannus verticalis*), western wood-pewee (*Contopus sordidulus*), tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica*), Bullock's oriole (*Icterus bullockii*), Wilson's warbler (*Wilsonia pusilla*), yellow warbler (*Dendroica petechia*), and blue grosbeak (*Guiraca caerulea*).

Mammals

Some of the larger mammals that may inhabit or seasonally use these areas include mule deer (*Odocoileus hemionus),* coyote *(Canis latrans),* bobcat *(Lynx rufus),* northern river otter (*Lutra canadensis*), beaver *(Castor canadensis),* and red fox (*Vulpes vulpes*). Smaller mammals likely to occur include Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), Audubon's cottontail (*Sylvilagus audubonii),* Yuma bat (*Myotis yumanensis),* long eared bat *(Myotis evotis),* and several species of rodents.

C. Endangered, Threatened and Rare Species

Species that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations are commonly referred to as special-status species. For the purposes of this plan, the designation of "special status" includes all of the following:

- Species identified as rare, threatened or endangered by the California Native Plant Society (CNPS)
- Species listed as threatened or endangered under the federal Endangered Species Act (ESA) or the California ESA
- Species of special concern as identified by the USFWS or CDFG, including Birds of Conservation Concern
- Species fully protected in California under the California Fish and Game Code
- Species identified as priorities for recovery under the CALFED Bay-Delta Program Multi-Species Conservation Strategy (MSCS)
- Species identified as priorities by the Western Bat Working Group

1. Special Status Plants

A database search of plant inventories indicates that 12 special-status plant species have the potential to occur on or in the vicinity of the MCCWA (CNPS 2006, CDFG 2006a). Of these, 2 have been confirmed present on the Cottonwood Creek Unit and BFW1. In addition, suitable habitat appears to occur on all the units for several other special-status plant species, primarily marsh species. Suitable habitat for several special-status vernal pool species may occur in the vernal ponds/swales on BFW1, although no special-status vernal pool plants have been observed and these features do not appear to be the deep, well-developed vernal pools generally preferred by such species. More detailed surveys may locate occurrences of these and other special-status plant species on one or more of the units that comprise the MCCWA.

Special-status plants that are known to occur, or that have the potential to occur based on the presence of suitable habitat, are discussed in this section. These species are designated by the CNPS as rare, threatened or endangered in California and elsewhere (List 1B) or rare, threatened or endangered in California but common elsewhere (List 2). Plants on the CNPS List 1 or 2 are legally protected under the provisions of the California Environmental Quality Act (CEQA) and CEQA Guidelines. Of the species described below, only Boggs Lake hedge-hyssop (*Gratiola heterosepala*) is also protected under the California Endangered Species Act (CESA). Information on special-status plants is summarized Table III-b, which follows the species descriptions below.

SPECIES DESCRIPTIONS: KNOWN TO OCCUR

Fox sedge *(Carex vulpinoidea)*
Status: California Native Plant Society List 2

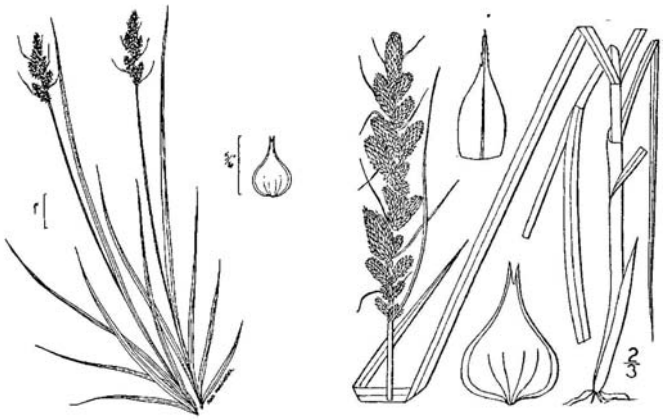


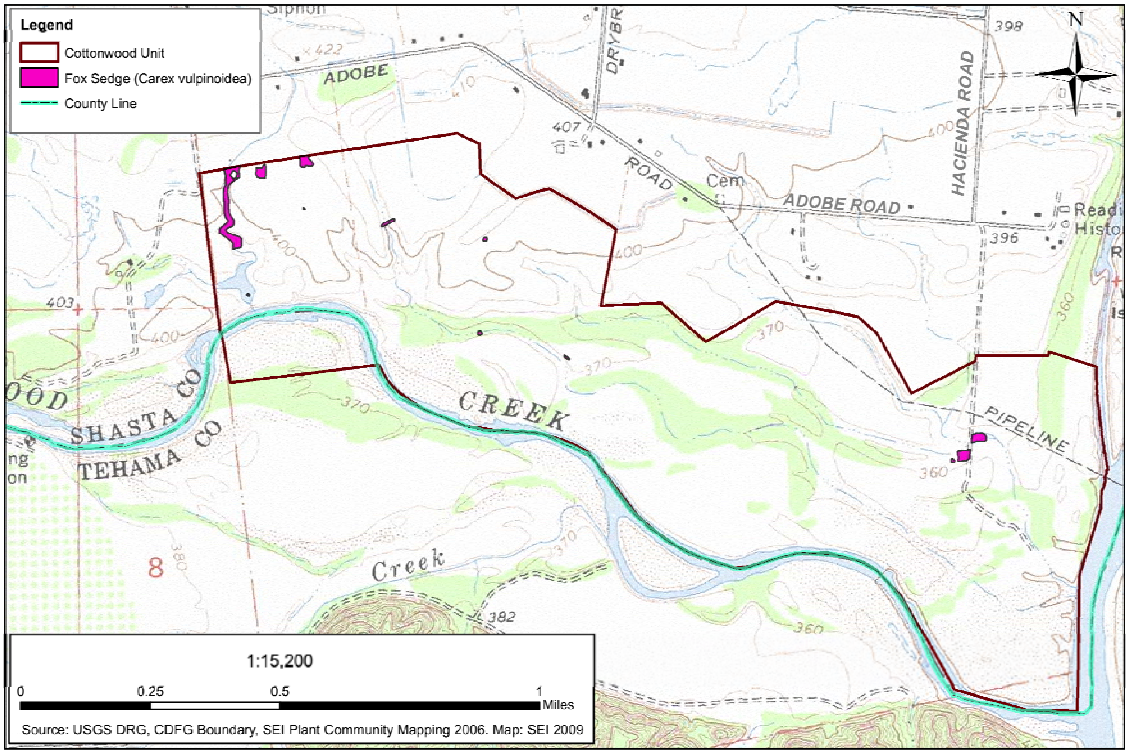
PHOTO: Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln.
ILLUSTRATION: USDA NRCS PLANTS Database

Fox sedge is a caespitose (tufted), moderately robust sedge with erect or ascending culms 30 to 60 cm (1 to 2 feet) tall and an elongate (5 to 10+ cm [2 to 4+ inches]), narrow inflorescence with, generally, a number of spikelets crowded together at the lower nodes that can be observed under close examination.

Fox sedge occurs in marshes and a variety of other wet places, and ranges widely across the United States and adjacent Canada. According to the USDA (2006), it is known to occur in every state in the continental United States except Utah. In California, however, it is of uncommon and sporadic occurrence, mainly in five north-central counties: Butte, Tehama, Shasta, Trinity, and Siskiyou (Tibor 2001; CNPS 2006; CDFG 2006a; Regents of University of California 2008). Additional collections have been reported from San Joaquin, Kern, and Los Angeles counties. Fox sedge was previously known to occur in the Battle Creek Wildlife Area, east of the Sacramento River approximately two miles east-northeast of the Cottonwood Creek Unit, and also from the vicinity of Anderson, approximately four miles northwest of the Balls Ferry wetland units.

On the Cottonwood Creek Unit, fox sedge occurs at a number of widely scattered localities on both terraces (Figure III-e) in moist to wet places in or at the margins of freshwater marshes and ponds, and at the margins of or in wet places within riparian forest. It also occurs in a disturbed low-lying area within the riparian restoration site in the eastern portion of the unit. It mostly occurs in relatively small, localized colonies, although it is more extensive in the freshwater marshes in the northern and western portions of the upper terrace. It is likely that this species occurs elsewhere in suitable habitat on this unit, in addition to those mapped.

Figure III-e. Fox sedge (*Carex vulpinoidea*), Cottonwood Creek Unit, MCCWA



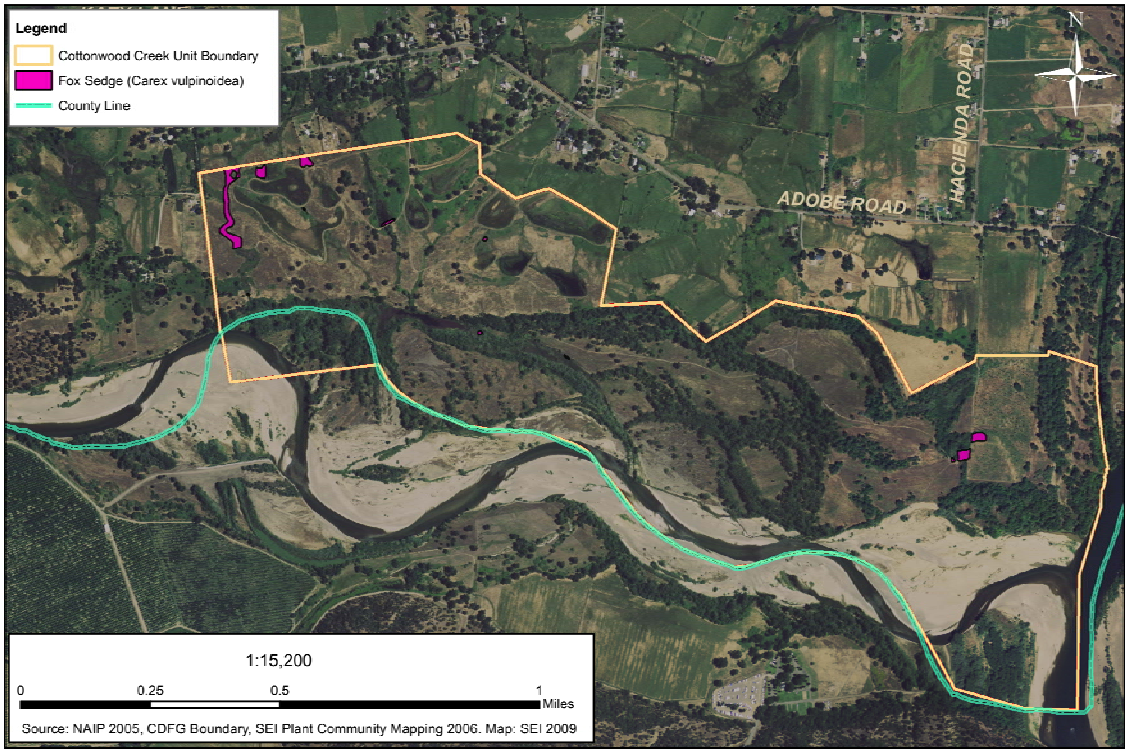
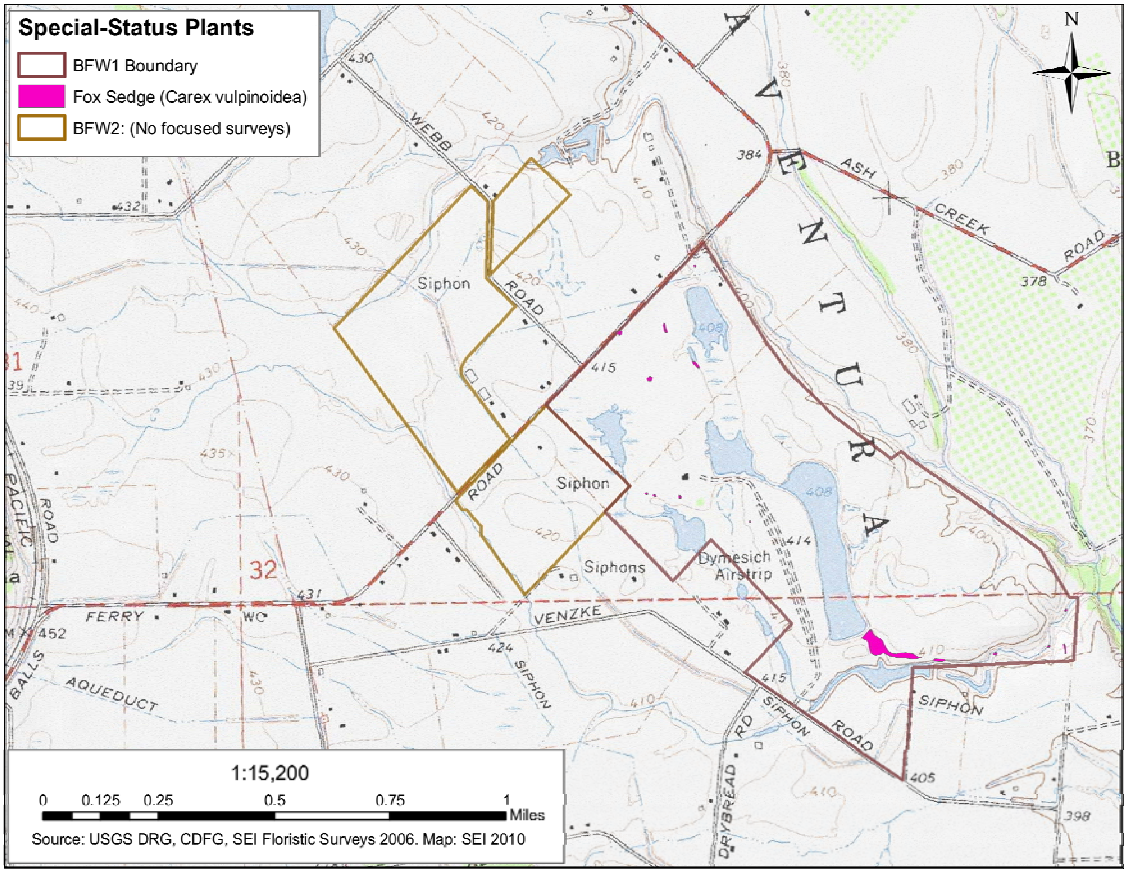
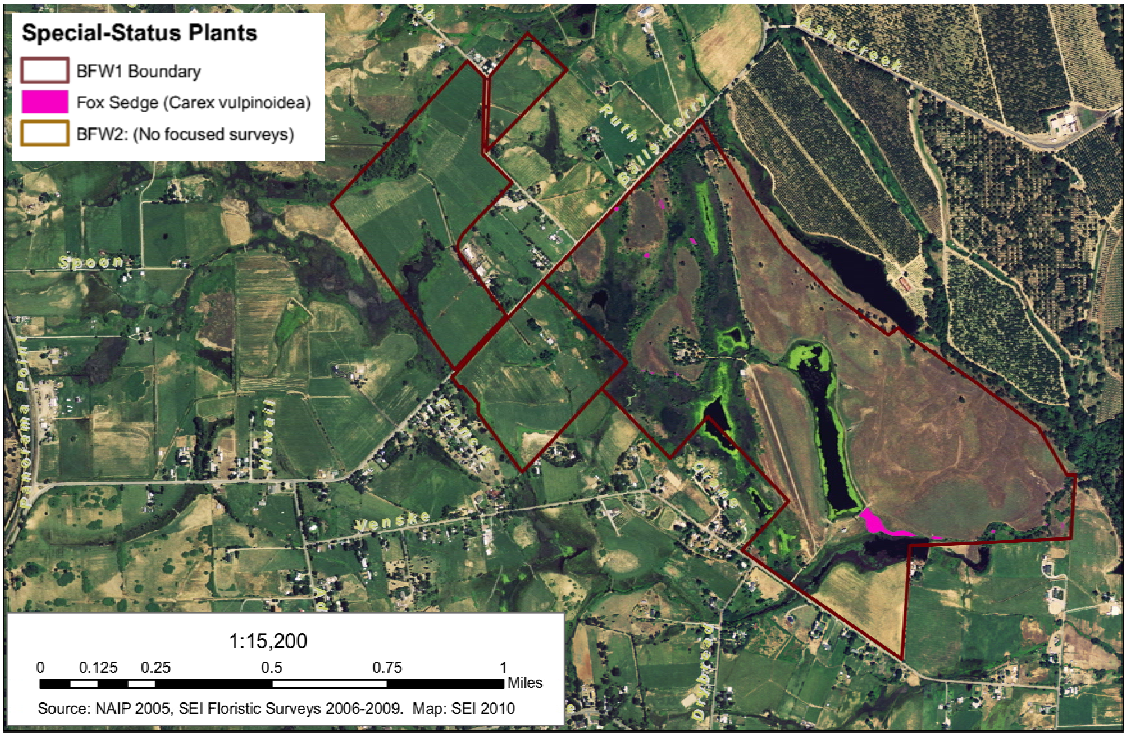


Figure III-f. Fox sedge (*Carex vulpinoidea*), Balls Ferry Wetland Unit 1, MCCWA





Fox sedge also occurs at a number of widely scattered locations on BFW1 (Figure III-f above), generally in more or less localized colonies near the margins of freshwater marshes and in other permanently moist to wet places. The most extensive colony of fox sedge on this unit is in freshwater marsh habitat at the northern margin of the southernmost (artificial) pond. As with the Cottonwood Creek Unit, it is likely that this species occurs elsewhere in suitable habitat on this unit in addition to the localities observed during the 2006 reconnaissance-level survey (Buck, unpublished report).

Silky cryptantha *(Cryptantha crinita)*
Status: California Native Plant Society List 1B

PHOTO: © 1988 Dean Wm. Taylor
Jepson Herbarium

Silky cryptantha is a small, erect, branched annual herb with white flowers. *Cryptantha* species can be difficult to distinguish, but silky cryptantha is distinct in having dense, long, soft, silky hairs (as opposed to rough or bristly hairs) on the calyx (outermost part of the flower). Silky cryptantha occurs in sandy or gravelly stream beds, creek bottoms, and gravel bars, and is known only from Tehama and Shasta counties.

Hubbell and Marr (1994) reported silky cryptantha from two locations in frequently flooded areas more or less in proximity to Cottonwood Creek. One location was near the mouth of the creek; it is impossible to determine exactly where the second location was, although they report that 18 plants were scattered along approximately one-half mile of the creek. They report that plants were located about 10 to 40 feet from the creek in both areas. The Cottonwood Creek meander channel has changed significantly since 1994, and the plant was not observed during the 2006 survey (Buck, unpublished report).

POTENTIAL TO OCCUR

Boggs Lake hedge-hyssop *(Gratiola heterosepala)*
Status: California Native Plant Society List 1B; State Endangered

PHOTOS (close up): © 2004 Carol W. Witham, Dales Lake ER, Tehama County
PHOTO (mid distance): © 1986 California Native Plant Society, unknown location

Boggs Lake hedge-hyssop is most commonly associated with vernal pool and lakeside habitats. Occupied wetlands are usually found with annual grassland, oak woodland, juniper woodland (*Juniperus spp.)* or coniferous forest habitats (USFWS 2005a). The vernal pool/swale habitat at the BFW1 may provide suitable but marginal habitat. Boggs Lake hedge-hyssop is an erect annual with hollow stems 2 to 10 cm (0.8 to 3.9 inches) tall. The stems are mostly hairless, except for a few glandular hairs in the inflorescence. The leaves are opposite and have entire margins. Leaves near the base of the stem are 1 to 2 cm (0.4 to 0.8 inch) long and lance-shaped, but the leaves become shorter, wider, and blunt-tipped farther up on the stem. The 6 to 8 mm (0.23 to 0.31 inch) long flowers are borne singly in the upper leaf axils. Each corolla has two lips; the tube and upper lip are yellow, whereas the lower II-135 lip is white. However, the flowers appear yellow from a distance. Although limited in distribution, this species is

known to occur in the northeastern and northwestern Sacramento Valley and the Solano-Colusa vernal pool regions (Keeler-Wolf et al.1998). Additional counties of occurrence are Lassen, Madera, Merced, San Joaquin, Siskiyou, Solano, and Tehama (USFWS 2005a).

Red Bluff dwarf rush *(Juncus leiospermus var. leiospermus)*
Status: California Native Plant Society List 1B

PHOTOS: © 1987 Dean Wm. Taylor, Oat Creek, Shasta County; © 2007 Brad Schafer, North Table Mountain

Red Bluff dwarf rush is found associated with vernal pools, meadows and seeps, vernally moist places in chaparral, cismontane woodland, valley and foothill grassland. Potentially suitable habitat may occur throughout the Wildlife Area.

Red Bluff dwarf rush is an inconspicuous grass-like annual, 2 to 12 cm (0.79 to 4.72 inch) tall, often turning reddish-brown; bracts inconspicuous; leaves basal, less than 3/4 length of stem; flowers usually 2 to 7 inch terminal heads; fruit round to oblong. It is found in the upper Sacramento Valley on floor and lower foothill terraces from northern Butte, Tehama and southern Shasta counties (BLM 2006b).

Legenera *(Legenere limosa)*
Status: California Native Plant Society List 1B

PHOTO: © 1993 Dean Wm. Taylor, Dales Lake

Legenera has been found in a variety of habitats including vernal pools, vernal marshes, artificial ponds, and floodplains of intermittent streams. Occupied vernal pool types include Northern Basalt Flow, Northern Claypan, Northern Hardpan, Northern Volcanic Ashflow, and Northern Volcanic Mudflow (Sawyer and Keeler-Wolf 1995). The surrounding plant community may be grassland, open woodland, or hardwood forest containing oaks species or California buckeye (*Aesculus californica)*.

Suitable but marginal habitat for this species may occur on BFW1. This plant is a small, inconspicuous annual. The main stems are 10 to 30 cm (3.9 to 11.8 inches) long and reclining, although any branches are erect. Extra roots often arise from the lower nodes. The leaves, which are produced underwater, are 1 to 3 cm (0.4 to 1.2 inches) long and narrowly triangular; they fall off the plant before flowers appear. The flower stalks are very slender and elongate as the fruit matures, reaching a final length of as much as 3 cm (1.2 inches).

Since 1984, *Legenere limosa* has been rediscovered at several historical sites and has been found at numerous new locations. During that same time period, the type locality and six other occurrences were extirpated. Among the 52 occurrences presumed to be extant, 20 are in Sacramento County, including 9 in the vicinity of Elk Grove and 6 in the vicinity of the former Mather Air Force Base. Another area of concentration, with 11 extant occurrences, is near Dozier in Solano County. Other counties where this species is presumed to remain are Alameda, Santa Clara, Sonoma, Lake, Napa, Placer, San Joaquin, San Mateo, Shasta, Tehama, and Yuba (USFWS 2005a).

Red-flowered lotus *(Lotus rubriflorus)*
Status: California Native Plant Society 1B

PHOTO: © 1998 John Game

The red-flowered lotus is a small annual herb that is native and endemic to California. This rare plant is known from only four disjunct occurrences in Colusa, Stanislaus, and Tehama Counties. It is associated with cismontane woodlands, and valley and foothill grasslands (CalFlora 2007). Suitable habitat for this species may occur on all three units of the MCCWA.

Sanford's arrowhead *(Sagittaria sanfordii)*
Status: California Native Plant Society 1B

PHOTOS: © 1991 Robert E. Preston, Ph.D.

Sanford's arrowhead is a freshwater marsh species which occurs in small ponds and sluggish waters of creeks, ditches and canals. A small perennial, this evergreen aquatic plant reaches approximately 13 cm (5.2 inch) tall. A fast grower, this is a summer flowering plant that has white petals with yellow centers. The plant's distribution is found along the North Coast (Del Norte County), the Central Valley (where it is mostly extirpated), and in Ventura County (BLM 2006c). Suitable habitat for this plant exists on all three units of the MCCWA, although none were observed during the 2006 surveys.

OTHER PLANT SPECIES OF SPECIAL INTEREST

At least two native species occurring on the survey units, common rush and bay forget-me-not (*Myosotis laxa*), are of particular interest for taxonomic or distributional reasons.

Common rush *(Juncus effusus* var. *pacificus)*

PHOTOS: Left, *Juncus effuses* var. *pacificus* stem and inflorescence, ©2008 Neal Kramer; right, var. *gracilis* stem and inflorescence, © 2004 Steve Matson

Two forms of common rush occur in freshwater wetland habitat on both units. One form has a relatively open inflorescence and perianth segments (petals/sepals) approximately 3 mm long. This form appears to represent *Juncus effusus* var. *pacificus*, according to the key and description in Swab (1993). Another form has a relatively dense, compact inflorescence with perianth segments only about 2 mm long. This form may represent *Juncus effusus* var. *gracilis*; that taxon, however, generally also has a relatively open inflorescence. The two forms often occur intermixed, but no plants observed in the Wildlife Area appeared to be intermediate between them. The status of these two forms may represent an unresolved taxonomic issue.

Bay forget-me-not *(Myosotis laxa)*

This native forget-me-not occurs in freshwater wetland habitat on both the Cottonwood Creek and BFW1 units, although it is uncommon. Its occurrence in this area appears to represent a range extension.

PHOTO: © 2008 Keir Morse

Although bay forget-me-not is widespread in North America, it is uncommon and sporadic in California. Consortium of California Herbaria accession records indicate that the species has previously been collected in Del Norte and Mendocino counties in northwestern California; at widely scattered locations in the Sierra Nevada in Tehama, Plumas, Butte, El Dorado, and Kern counties; in the lower Sacramento Valley in Sacramento County; and at one location in Siskiyou County (Regents of University of California 2008). It is apparently not previously known from the upper Sacramento Valley or Cascade foothills transition region. The plants observed are clearly identifiable as this species based on the combination of appressed calyx hairs, none of which are hooked, and relatively small flowers (2 to 5 mm diameter) (Joyal 1993).

Table III-b. Special Status Vascular Plant Species with Potential to Occur at the MCCWA

California Native Plant Society (CNPS) Designations:

List 1A: Plants presumed extinct in California

List 1B: Plants rare, threatened, or endangered in California and elsewhere

List 2: Plants rare, threatened, or endangered in California, but more common elsewhere

FT = Federal Threatened

SE = State Endangered

Species Common Name	Status	Habitat	Flowering Period	Potential for Occurrence
Carex scoparia **Pointed broom sedge**	CNPS 2	Moist places, Great Basin scrub.	May	Unknown. CNDDB reports occurrence approximately 1.5 mi. WNW of BFW1; habitat unknown.
Carex vulpinoidea **Fox sedge**	CNPS 2	Freshwater marshes, riparian woodland.	May-Jun	Observed in 2006.
Clarkia borealis ssp. *arida* **Shasta clarkia**	CNPS 1B	Openings in cismontane woodland, lower montane coniferous forest.	Jun-Aug	No suitable habitat exists in survey areas.
Cryptantha crinita **Silky cryptantha**	CNPS 1B	Sandy or gravelly streambeds in cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland, valley and foothill grassland.	Apr-May	Reported from frequently flooded areas on the Cottonwood Creek Unit by Hubbell and Marr (1994). No suitable habitat exists on the Balls Ferry wetland units.
Gratiola heterosepala **Boggs Lake hedge-hyssop**	SE CNPS 1B	Vernal pools, lake margins.	Apr-Aug	Suitable, but marginal, habitat may occur on the Balls Ferry wetland units.
Juncus leiospermus var. leiospermus **Red Bluff dwarf rush**	CNPS 1B	Vernal pools, meadows and seeps, vernally moist places in chaparral, cismontane woodland, valley and foothill grassland.	Mar-May	Potentially suitable habitat may occur on the Balls Ferry wetland units and possibly the Cottonwood Creek Unit.
Legenere limosa **Legenera**	CNPS 1B	Vernal pools.	Apr-Jun	Suitable, but marginal, habitat may occur on the BFW1.
Lotus rubriflorus **Red-flowered lotus**	CNPS 1B	Cismontane woodland, valley and foothill grassland.	Apr-Jun	Suitable habitat may occur throughout the Wildlife Area.
Orcuttia tenuis **Slender Orcutt grass**	FT SE CNPS 1B	Vernal pools.	May-Sep (Oct)	No suitable habitat exists in survey areas (requires relatively deep, well-developed vernal pools).
Paronychia ahartii **Ahart's paronychia**	CNPS 1B	Seasonally moist places. cismontane woodland, valley and foothill grassland, vernal pools.	Mar-Jun	Habitat limited; therefore potential for occurrence low.
Sagittaria sanfordii **Sanford's arrowhead**	CNPS 1B	Assorted shallow freshwater marshes and swamps.	May-Oct	Suitable habitat may occur throughout the Wildlife Area.

2. Special Status Wildlife

A review of the California Natural Diversity Database (CNNDB) and the USFWS online inventory of Threatened and Endangered Species by County indicates there are 39 special-status wildlife species that have potential to occur in the vicinity of the MCCWA (CDFG 2006, 2009; USFWS 2006b, c, 2008). This list includes 3 invertebrates, 3 fish, 1 amphibian, 1 reptile, 29 birds, and 2 mammals. Of these, 18 have been confirmed as occurring in the Wildlife Area either as resident or migrant species and 11 are unlikely to occur based upon existing habitat conditions and known species distribution. Suitable habitat for 10 remaining species has been documented at the MCCWA. Focused surveys will be required to document the occurrence of these additional 10 species.

Special-status wildlife species that are known or have potential to occur in the MCCWA are presented below along with information on each species' regulatory status, habitat requirements, and likelihood of occurrence. Migratory birds described as "winter" visitors may occur in small numbers throughout the year but do not breed in the area and are most common in winter. Information on special-status wildlife is summarized in Table III-c, which follows the species descriptions below. Species on CDFG's Watch List are not included in the discussion.

SPECIES DESCRIPTIONS: KNOWN OR POTENTIAL TO OCCUR

Invertebrates

Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*
Status: Federal Threatened (1980); recommended for delisting September 2006 (USFWS 2006b, c), CALFED Recovery

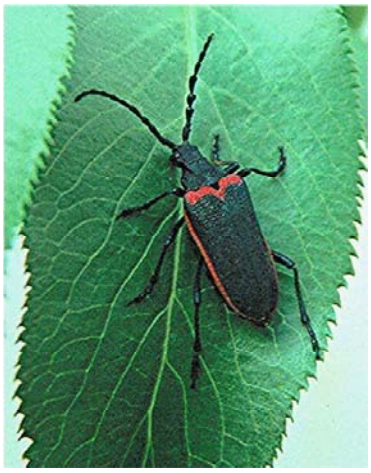


PHOTO: USFWS

The valley elderberry longhorn beetle (VELB) is completely dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. The VELB is a wood borer, and spends most of its life in the larval stage living within the stems of elderberry plants. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The VELB life cycle takes one or two years to complete. Adults emerge from the stems from late March through June (about the same time the elderberry produces flowers) to feed on elderberry leaves and flowers and find mates (Barr 1991, USFWS 1984, 1999 and 2006e). The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

The MCCWA is known to support specimens of the valley elderberry shrub, the host plant for the valley elderberry longhorn beetle. No specific surveys for this species have been conducted.

Vernal Pool Invertebrates

Vernal pool fairy shrimp *(Branchinecta lynchi)*
Status: Federal Threatened, CALFED Maintenance

Vernal pool tadpole shrimp *(Lepidurus packardi)*
Status: Federal Endangered, CALFED Maintenance

PHOTO: Adult fairy shrimp, USGS

PHOTO: Adult tadpole shrimp, USGS

Vernal pools are seasonally flooded depressions found on ancient soils with an impermeable layer such as a hardpan, claypan, or volcanic basalt. The impermeable layer allows the pools to retain water much longer then the surrounding uplands; nonetheless, the pools are shallow enough to dry up each season. Vernal pools often fill and empty several times during the rainy season. Vernal pool invertebrates (fairy and tadpole shrimp) are highly adapted to the environmental conditions of their ephemeral habitats. One adaptation is the ability of the fairy shrimp eggs, or cysts, to remain dormant in the soil when their vernal pool habitats are dry. Another important adaptation is that the fairy shrimp has a relatively short life span, allowing it to hatch, mature to adulthood, and reproduce during the short time period when vernal pools contain water (USFWS 2005a).

Vernal pool tadpole shrimp, vernal pool fairy shrimp, and California linderiella may also inhabit vernal swales, provided that water remains ponded in the swales long enough for the shrimp to mature and reproduce (a minimum of 18 days for vernal pool fairy shrimp, 31 days for California linderiella, and 41 days for vernal pool tadpole shrimp). One small vernal swale on BFW1 is known to support vernal pool plant species; however, no focused surveys have been conducted for vernal pool invertebrates. No vernal pool habitat exists on the Cottonwood Creek Unit or on BFW2.

Fish

The Coleman Fish Hatchery, located east of the Sacramento River from the MCCWA, is the largest Chinook salmon hatchery in the United States. Cottonwood Creek itself supports significant fish populations on a seasonal and year-round basis due to a number of environmental factors including hydrology, stream temperature, channel morphology, gravel recruitment and access. With anadromous fish no longer able to return to their historic upstream spawning grounds, second-tier streams like Cottonwood Creek may have significant spawning restoration potential (Western Shasta RCD 2003).

Chinook salmon *(Oncorhynchus tshawytscha)*

Status: Spring Run: Federal and California Threatened, Critical Habitat Designation, CALFED Recovery
Status: Fall and Late-Fall Run: California Species of Concern, CALFED Recovery


PHOTO: USFWS

In the Cottonwood Creek drainage, three races of Chinook salmon have been documented: fall run, late-fall run, and spring run. Due to the differences in the timing of their spawning runs, these three races are considered biologically distinct. Fall-run Chinook salmon ascend Cottonwood Creek and spawn in late October through November (CH2MHill 2002). Juvenile salmon begin migrating following emergence as early as December, and smolts continue to leave the stream through May (Moyle 2002). It is estimated that on average, approximately 1,000 to 1,500 adult fall-run Chinook salmon return to spawn in Cottonwood Creek each year (CH2MHill 2002). The CDFG estimates fewer than 500 late-fall run and fewer than 500 spring-run Chinook salmon return to spawn in Cottonwood Creek each year (CDFG 1993a).

As their name implies, spring-run Chinook migrate upstream during the spring floods and stay in the higher elevation streams until the fall spawning period. Beegum Creek, a major tributary of Cottonwood Creek, supports a small population of spring-run Chinook (Leidy and Sisco 1999). The creek is the furthest from the ocean of all California salmon spawning streams, and the fish experience some of the highest water temperatures there. Due to high water temperatures that begin in May at the mouth of Cottonwood Creek, the population arrives upstream earlier than most spring-run Chinook; spawning begins in mid- to late October, later than most spring-run Chinook populations (CDFG 2004b).

The Final Restoration Plan for the Anadromous Fish Restoration Program (USFWS 2001) established a population target of 5,900 Chinook salmon for the Cottonwood Creek watershed. In 2005, the Cottonwood Creek watershed was designated as critical habitat for the spring-run Chinook (NMFS 2005).

Central Valley Steelhead *(O. mykiss)*
Status: Federal Threatened, Critical Habitat Designation, California Species of Special Concern, CALFED Recovery


PHOTO: USDA

Steelhead are anadromous rainbow trout, differentiated by their size (steelhead are generally longer than 16 inches) and by their color (the skin turns silvery-grey after spending one or more years in the ocean). In Central Valley streams and rivers, steelhead occurs only during the winter months, when water temperatures are cooler and flows are higher (Moyle 2002). Steelhead enter Cottonwood Creek during November or December and spawn during the winter or spring months. The upper reaches of the Middle Fork, Beegum Creek, and the South Fork provide spawning and nursery habitat for these fish. Young steelhead spend one to three years in freshwater before migrating to the ocean. Because steelhead migrate during high flows, it is difficult to distinguish juvenile steelhead from resident rainbow trout. In

1989, the population of steelhead spawners in Cottonwood Creek was estimated to be only a few hundred fish (Sacramento River Advisory Council 1989). Cottonwood Creek was identified as one of the three best candidates for steelhead restoration in the Upper Sacramento watershed (McEwan and Jackson 1996) and was designated as critical habitat for winter-run steelhead in 2005 (NMFS 2005).

Amphibians

California red-legged frog *(Rana draytonii)*

Status: Federal Threatened, California Species of Special Concern, CALFED Maintenance

PHOTO: Chris Brown, USGS

The California red-legged frog (CRLF) requires a variety of habitat elements with aquatic breeding areas embedded within a matrix of riparian and upland dispersal habitats. Breeding sites of CRLF are in aquatic habitats, including pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds and lagoons. Additionally, CRLF frequently breed in artificial impoundments such as stock ponds.

There are no records of California red-legged frogs from Shasta County in the CNNDB (CDFG 2006a). Historically, CRLF was found in several counties in this region. In the 1960s, CRLF were found in Glenn County east of Elk Creek and in many drainages in Colusa County. In 1986 and 1987, CRLF were reported in Sunflower Gulch and Cottonwood Creek, west of Red Bluff (Tehama County). However, subsequent surveys have documented only bullfrogs (*Rana catesbeiana*) (Jennings and Hayes 1994). The Cottonwood Creek Core Area, as identified in the California Red-legged Frog Recovery Plan, lies within the Cottonwood Creek and Red Bank Creek watersheds, with the majority of it being within the Cottonwood Creek watershed in Tehama County. This core area is one of the areas identified within the North Coast Range Foothills and Western Sacramento River Valley Recovery Unit and is a potential source for reintroduction of this species to its former range (USFWS 2002).

A Safe Harbor Agreement for private landowners in the Cottonwood Creek watershed to assist with enhancing habitat for the California red-legged frog was finalized with USFWS on 11 December 2006 (USFWS 2006d). The Cottonwood Creek Watershed Group received a grant to conduct focused CRLF surveys in 2007. The data will be provided to CDFG to assist in management of the MCCWA (V. Swearingen, Cottonwood Creek Watershed Group, personal communication).

Reptiles

Northern Pacific pond turtle *(Actinemys* [=*Clemmys*] *marmarota)*
Status: U.S. Forest Service Sensitive Species, California Species of Special Concern, CALFED Maintenance


PHOTO: © 1999 California Academy of Sciences

The western pond turtle is California's only native freshwater turtle. The Northern Pacific subspecies is found from San Francisco Bay northward into southern British Columbia. Pond turtles are found near a wide variety of wetlands, including ponds, marshes, lakes, streams, irrigation ditches, and vernal pools. They prefer aquatic habitats with adequate vegetative cover and exposed basking sites. Pond turtles are omnivorous generalists and opportunistic predators, eating small insects, aquatic invertebrates, fish, frogs, snakes, birds and mammals (Jennings and Hayes 1994). Over 90% of the freshwater ponds, marshes and year-round streams where the turtles once lived have been drained, diverted or developed. Where the turtles can still be found, many populations no longer produce offspring, the result of disturbed nesting grounds and the predation of young turtles by non-native bullfrogs and black bass. The turtles spend most of their lives in the water, but need well-drained silty soil to lay their eggs. The female will travel over 400 meters to find suitable nesting sites in upland areas away from the water. In late spring, one to 13 eggs are laid in a shallow hole, which is then covered with dirt. Nests are highly susceptible to predators as well as to trampling by cattle or people. With a life span of over 40 years, the presence of turtles may be a false indication that populations are healthy (Garrison 1998). During field surveys in 2005 and 2006, Northern Pacific pond turtles were observed in the slough between the Cottonwood Creek Unit and Reading Island (Cull, unpublished field data).

Birds

Water Birds

Tule greater white-fronted goose *(Anser albifrons)*
Status: California Species of Special Concern (wintering)


PHOTO: © Terry Spivey, USDA, creative commons

White-fronted geese are winter visitors to California, usually arriving from their arctic breeding grounds in September and leaving by mid-April (Small 1994). Some individuals have remained throughout the summer in northern California, especially in the Klamath Basin and Sacramento Valley. White-fronted geese are found primarily around freshwater lakes and marshes, and open agricultural lands and grain fields, usually in association with other geese species. Comprising four subspecies worldwide, the greater white-fronted goose has a nearly circumpolar Arctic breeding distribution (Deuel and Takekawa 2008). Two subspecies breed in North America: the Pacific greater white-fronted Goose (*A. a. frontalis*) and the tule greater white-fronted goose (*A. a. elgasi*). Approximately 200,000 of the Pacific greater white-fronted goose winter in the Central Valley; of the tule subspecies, rarely have more than a few hundred been sighted here. The estimated total population of the tule white-fronted goose is between 5,000 and 10,000 (ibid). White-fronted geese (unknown subspecies) have been observed wintering on BFW2 (J. Chakarun, personal communication).

Common loon *(Gavia immer)*
Status: California Species of Special Concern


PHOTO: © 2005 Matthews, creative commons

Primarily a migrant and winter visitor to California, common loons are frequently observed during winter months along the entire coast. Common loons are mostly found in bays and harbors along the coast, but may also be found inland on large reservoirs and deep lakes during the spring and fall migration (Small 1994). They are rare during summer. There are historic records of common loons nesting in lakes east of Mt. Lassen in Shasta County (Grinnell and Miller 1944), but no recent nesting records. The Bird List for Shasta County records this species as a winter visitor, with observations during spring and fall (Wintu Audubon Society 1999).

American white pelican *(Pelecanus erythrorhynchos)*
Status: California Species of Special Concern

PHOTO: Roger Dearnaley, creative commons

American white pelicans forage for fish in open water and have been observed at BFW1 (K. Nolte, Shasta College, personal communication; Cull, unpublished field observations). American white pelicans do not nest in the Central Valley (Grinnell and Miller 1944, Small 1994).

Least bittern *(Ixobrychus exilis)*
Status: California Species of Special Concern

PHOTO: © 2005 Mike Baird, creative commons

Least bitterns are rare to uncommon summer residents in California, found in freshwater emergent wetland habitats throughout the state. A highly secretive bird, it nests, roosts, and hides in dense emergent vegetation. The current population status of this species is not well documented. Most of the California population migrates to Mexico for winter, although a small subset in southern California appears resident year-round (Sterling 2008). Suitable habitat for this species consists of freshwater and brackish marshes with tall, dense emergent vegetation and clumps of woody plants over deep water (ibid).

Raptors[*]

White-tailed kite *(Elanus leucurus)*
Status: California Fully Protected, CALFED Maintenance

PHOTO: © 2004 Tom Greer
tbphotos@comcast.net

White-tailed kites nest in large and medium-sized trees such as oaks and cottonwood and forage in grasslands, low shrub habitat, and agricultural fields (Zeiner et al. 1990b, Johnsgard 1990). White-tailed kite foraging activity has been observed at the MCCWA.

[*] The MCCWA provides high-quality habitat for five special-status raptors. California Fish and Game Code §3503.5 provides protection for all raptor nests, including those of the species below. Their nests are also protected by the Migratory Bird Treaty Act.

Bald eagle *(Haliaeetus leucocephalus)*
Status: Federal delisted, Bird of Conservation Concern, California Endangered, Fully Protected, CALFED Maintenance,

PHOTO: Gerald and Buff Corsi
© 2007 California Academy of Sciences

Bald eagles are known to nest along Cottonwood Creek (CDFG 2006a). They have been observed foraging at the confluence of Cottonwood Creek and the Sacramento River and roosting in cottonwoods along the southern bank of Cottonwood Creek directly across from the Wildlife Area (Cull, unpublished field observations).

Northern harrier *(Circus cyanus)*
Status: California Species of Special Concern, CALFED Maintenance

PHOTO: © 2006 Tom Greer tbphotos@comcast.net

Northern harriers nest and forage in a variety of open habitats including marshes, grasslands, low shrublands, and agricultural fields. Harriers are ground nesters and prey on a variety of small animals, particularly rabbits, mice, voles and small birds (Johnsgard 1990).

Swainson's hawk *(Buteo swainsoni)*
Status: Federal Bird of Conservation Concern, U.S. Forest Service Sensitive Species, California Threatened, CALFED Contribute to Recovery


PHOTO: Creative Commons License

Swainson's hawks breed in the western United States and Canada and winter in South America as far south as Argentina. California has two distinct Swainson's hawk breeding areas: the Central Valley and the Great Basin (including portions of Siskiyou, Modoc and Lassen counties). There are few breeding records from Shasta County, although there is one record from Shasta Valley (CDFG 2006b). Swainson's hawks are adapted to open grassland habitats, and have become increasingly dependent on agriculture as native plant communities are converted to agricultural lands. The California vole (*Microtus californicus*) is a dietary staple; however, a variety of other small mammals, birds, and insects are also consumed. In the Central Valley, Swainson's hawks often nest peripheral to riparian systems. They will also use lone trees in agricultural fields or pastures and roadside trees when available and adjacent to suitable foraging habitat. Valley oak, Fremont cottonwood, walnut *(Juglans* spp.), and willow (*Salix* sp.), with an average height of 17.6 meters (57.7 feet) and ranging from 12.6 to 25 meters (41.3 to 82.0 feet), are the most commonly used nest-tree species (CDFG 1993a).

American peregrine falcon *(Falco peregrinus anatum)*
Status: Federal delisted, Bird of Conservation Concern, U.S. Forest Service Sensitive Species, California Endangered, Fully Protected, CALFED Maintenance


PHOTO: Gerald and Buff Corsi
© 2002 California Academy of Sciences

Historically, the American peregrine falcon was distributed throughout the Sierra Nevada and most of California (Grinnell and Miller 1944). Now, it is uncommon as a breeding resident and uncommon as a migrant (Zeiner et al. 1990b). The American peregrine falcon nests on vertical cliffs with large potholes or ledges that are inaccessible to land predators. Because this species preys primarily on birds, nest sites are usually located near areas that support large avian populations, such as coastal areas or wetlands. Peregrine falcons may travel long distances from their nesting grounds to foraging habitats (Grinnell and Miller 1944, Zeiner et al. 1990b). Breeding activity begins as early as March and ends in August (Zeiner et al. 1990b). In winter 2006, a peregrine falcon was observed hunting waterfowl at BFW1 (Santry, personal communication).

Cranes

Greater sandhill crane *(Grus canadensis tabida)*
Status: U.S. Forest Service Sensitive Species, California Threatened, Fully Protected, CALFED Contribute to Recovery


PHOTO: © Rebecca Cull

The greater sandhill crane is one of six subspecies of sandhill cranes found in North America (Littlefield 1989). There are five recognized populations of greater sandhill cranes. The Central Valley population winters in California's Central Valley, and nests in northeastern California, eastern Oregon, portions of Nevada and Washington, and British Columbia (Smith 1999). They congregate in large flocks at night roosts and disperse during the day to forage in grasslands and emergent wetlands, as well as moist croplands with rice or corn stubble. In winter, this species is most densely concentrated in counties south of Yolo County and in agricultural regions and large preserves that support vast fields of suitable habitat. Greater sandhill cranes have been observed in migration over the MCCWA (Santry, personal communication), but are not known to nest in this portion of Shasta County.

Cuckoos

Western yellow-billed cuckoo *(Coccyzus americanus occidentalis)*
Status: Federal Candidate, Bird of Conservation Concern, U.S. Forest Service Sensitive Species, California Endangered, CALFED Contribute to Recovery


PHOTO: GFDL, Mdf

The current population of the Western yellow-billed cuckoo is about 60 to 100 pairs statewide (RHJV 2004). Western yellow-billed cuckoos are neotropical migrants that breed in riparian habitats dominated by cottonwood and willows. The species was listed by the State of California as threatened in 1971 and was reclassified as endangered in 1987. They have undergone drastic decreases in population in California and most areas throughout the West. The declines have been directly attributed to loss of breeding habitat from clearing and removal of huge areas of riparian forest for agriculture, urban development and flood control (USFWS 2005b). Based on a 1986-87 statewide survey, only three areas in California support more than about five breeding pairs on a regular basis (ibid.):

- Sacramento River roughly between Colusa and Red Bluff
- South Fork of the Kern River upstream of Lake Isabella
- Lower Colorado River

Passerines

Vaux's swift *(Chaetura vauxi)*
Status: California Species of Special Concern (nesting)


PHOTO: © Jerry Oldenettel, creative commons

Although Vaux's swifts have been observed at the MCCWA, there are no nesting records in Shasta County (Santry, personal communication). They are usually observed in the Central Valley only during migration. In California, their breeding range is primarily the forested coastal regions from Del Norte County to Santa Cruz County, with a small breeding population possibly also occurring in Monterey County (Small 1994). Nesting sites are most commonly associated with old growth forest. Breeding populations also occur locally and in low densities throughout northeastern California and south in the Sierra Nevada to Tulare County (Sterling and Paton 1996).

Willow flycatcher *(Empidonax traillii)*
Status: California Endangered, CALFED Contribute to Recovery


PHOTO: Steve Zack, USFWS

Willow flycatchers historically nested throughout California, preferring riparian deciduous shrubs, particularly willow thickets (Grinnell and Miller 1944). Currently, three subspecies of the willow flycatcher breed in California. Each has been listed as state Endangered and USFS Region 5 Sensitive in California. Willow flycatchers are known to nest in the southeastern portion of Shasta County and in montane riparian habitats in the Cascade-Sierra Range (Sedgwick 2000). They occur in the Central Valley during spring and fall migration and breed in scattered riparian habitats.

Bank swallow *(Riparia riparia)*
Status: California Threatened, CALFED Recovery


PHOTO: © Scott Elowitz

The bank swallow is the smallest North American swallow, with a body length of about 4.75 inches. Bank swallows are distinguished from other swallows by their distinct brown breast band contrasting with white underparts. The upper parts are brown. The species nests in colonies and creates nests by burrowing into vertical banks consisting of fine-textured soils. Bank swallows breed in California from April to August and spend the winter months in South America. Currently, bank swallows are locally common only in restricted portions of California where sandy, vertical bluffs or riverbanks are available for the birds to dig their burrows and nest in colonies. Most of California's remaining populations nest along the upper Sacramento River where it still meanders in a somewhat natural manner. In this alluvial plain, the river system provides suitable soil types and erosion features needed for prime nesting habitat. It is estimated that the range of bank swallows in California has been reduced by 50% since 1900. Seventy-five percent of the California population is concentrated on the banks of Central Valley streams, including several colonies on the Sacramento River (Garrison et al. 1989).

Loggerhead shrike *(Lanius ludovicianus)*
Status: Bird of Conservation Concern, California Species of Special Concern


PHOTO: © Jerry Oldenettel, creative commons

The loggerhead shrike is the only one of the world's 30 species of true shrikes that occurs exclusively in North America. Like other shrikes, it inhabits ecotones, grasslands, and other open habitats and feeds on a variety of invertebrate and vertebrate prey. Compared to most birds, its head is large in proportion to its body size—hence the name loggerhead, which also means blockhead (Yosef 1996). Also called the 'butcher birds,' loggerhead shrikes impale their prey on thorns or barbed wire. Similar in coloration to mockingbirds, loggerhead shrikes' heads have a distinctive black mask and hooked beak. Males and females are similar in size. In California, loggerhead shrikes breed mainly in open shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. They require tall structures such as shrubs, trees, fences or power lines for hunting perches and territorial maintenance, as well as impaling sites for prey manipulation and storage (Humple 2008). Loggerhead shrikes have been observed at the MCCWA (Santry, personal communication).

Purple martin *(Progne subis)*
Status: California Species of Special Concern


PHOTO: Dori, creative commons

Purple martins, the largest swallow in North America, are neotropical migrants; they migrate north in the spring to breed in Mexico, the United States, and Canada. In late summer, after their young have left the nest, they migrate south to their non-breeding range in South America. Martins are secondary cavity nesters; this means they nest in a cavity, but do not excavate the cavity themselves. Instead, they use old woodpecker cavities or natural cavities in dead trees, cliff faces, etc. (Purple Martin Conservation Association 2006). Along the west coast of the United States, the purple martin population has substantially declined in the last 50 to 100 years. This decline is primarily associated with three major causes: habitat loss due to urban development, forest management and fire suppression (reducing the availability of large snags for nesting), and the introduction and proliferation of the European starling and house sparrow (competition for nesting cavities) (Airola and Williams 2008, Western Purple Martin Working Group 2005). Purple martins are a rare to uncommon breeding species in northern and central California with a spotty distribution (Small 1994). They occur in California as summer residents and migrants, primarily from mid-March to late September; nesting is from May (rarely late April) to mid-August (Williams 1998). Purple martins require large trees with numerous cavities for nesting, utilizing western sycamore and cottonwoods in the lower elevations and oaks and conifers at higher elevations. There are records of them using lava tubes for nesting (Airola and Williams 2008). Small numbers nest in holes and cavities under freeway structures in the Central Valley (Williams 1998).

California yellow warbler *(Dendroica petechia brewsteri)*
Status: Bird of Conservation Concern, California Species of Special Concern, CALFED Contribute to Recovery


PHOTO: © 2007 Ron Wolf

Yellow warblers are neotropical migrants that breed in North America and winter from Mexico to northern South America. Yellow warblers nest in a variety of shrubs associated with wetland habitats. Dense growth may be preferred in order to reduce nest predation and brood parasitism. The males are sometimes polygamous. The female builds a neat, compact cup nest in an upright twig fork 2 to 12 feet up, sometimes up to 40 or even 60 feet. The cup is made of wool, plant down, dry weed stem fibers, and fine grass stems, then lined with plant fibers, cotton, plant down, and sometimes feathers. Incubation of the 3 to 6 (usually 4 or 5) whitish spotted eggs is for 11 days. Both parents tend the nestlings until fledging occurs at 9 to 12 days (Lowther et al. 1999).

Yellow-breasted chat *(Icteria virens)*
Status: California Species of Special Concern, CALFED Maintenance


PHOTO: Britannica

Yellow-breasted chat numbers are declining throughout the Central and San Joaquin Valleys (Eckerle and Thompson 2001); however, they are still relatively common during the breeding season in Siskiyou and Shasta counties. Yellow-breasted chats have been documented at BFW1 during annual Breeding Bird Surveys (Santry, personal communication). In California, chats require dense riparian thickets of willows, vine tangles, and dense brush associated with streams, swampy ground and the borders of small ponds (Small 1994). In Shasta County, most chat nests are found in Himalayan blackberry (Burnett and DeStaebler 2003). Other plant species used for nesting include California blackberry, California wild rose, and pipevine. Any management efforts to remove this blackberry from riparian areas (e.g., exotic plant removal programs) should first assess any detrimental effects the removal may have on local breeding chats.

Tricolored blackbird *(Agelaius tricolor)*
Status: Bird of Conservation Concern, California Species of Special Concern, CALFED Maintenance

PHOTO: © John Stirling

The tricolored blackbird is largely endemic to California (RHJV2004). The Sacramento and San Joaquin valleys and southwestern California are the heart of the tricolor's historical breeding range – and home to the largest remaining colonies. Adult males are a glossy blue-black with striking red and white shoulder patches, while females are mostly black with grayish streaks, with a small but distinct reddish shoulder patch. The tricolored blackbird is a medium-sized bird (total length ranges from 12 to 24 cm) that breeds in dense colonies. Tricolored blackbirds typically eat insects but will also take grains, snails and small clams (Center for Biological Diversity 2006). Tricolors will often use exotic plants, such as Himalayan blackberry thickets, as nesting substrates.

Yellow-headed blackbird *(Xanthocephalus xanthocephalus)*
Status: California Species of Special Concern


PHOTO: Phil Norton, USFWS

Primarily wintering in northern and western Mexico, yellow-headed blackbirds occur in California as seasonal migrants and summer residents (Jaramillo 2008). Depending upon the location, their breeding season extends from mid-April to late July. Yellow-headed blackbirds have a patchy distribution in California, but are locally numerous. This colonial species breeds almost exclusively in marshes with tall emergent vegetation such as tules (Scirpus spp.) or cattails (Typha spp.), where there is relatively deep water (ibid.); however, they have been documented nesting in low vegetation such as spikerush (Eleocharis). Because of their need to build their nests over deeper water, yellow-headed blackbird breeding sites are often at the edges of large ponds, lakes and reservoirs (ibid.).

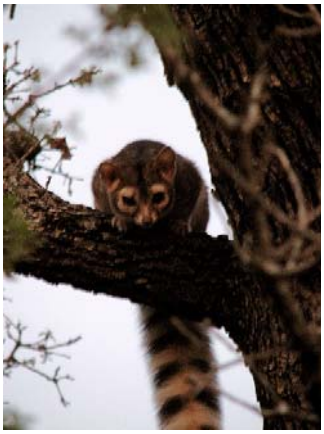
Mammals

Pallid bat *(Antrozous pallidus)*
Status: California Species of Special Concern, Western Bat Working Group High Priority


PHOTO: © M. Tuttle

Pallid bats occur throughout California, except in the high Sierra Nevada, from Shasta to Kern counties and the northwestern corner of the state from Del Norte and western Siskiyou counties (Hall 1981). These bats inhabit a variety of habitats, including grasslands, shrublands, woodlands, and forests from sea level up through mixed coniferous forests. They are common in grasslands and desert regions in the southwestern United States and most abundant in the Sonoran life zones; less abundant in evergreen and mixed forests than in vegetation assemblages characteristic of lower elevations (Hermanson and O'Shea 1983). Pallid bats reside yearly in the majority of their range and they have been collected at sites up to 8,000 feet in elevation. In California pallid bats are associated with oak woodlands at lower elevations (CDFG 1995) and may roost in a variety of places including tree cavities, rock crevices and human-made structures.

Ringtail *(Bassariscus astutus)*
Status: California Fully Protected, CALFED Maintenance



The ringtail range extends as far north as southwest Oregon, throughout California except the agricultural portion of the Central Valley, east to Colorado, and south into Central America. They are found in a variety of habitats including dense riparian growth, montane evergreen forests, oak woodlands, pinyon juniper, chaparral, and deserts (Kaufmann 1982). Their territory is usually no farther than one-half mile away from a permanent water source and they find reproductive and resting cover in hollow trees, logs, snags, rocks, and abandoned burrows. Nocturnal and secretive, ringtails feed on a variety of small mammals, lizards, invertebrates, and birds (Zeiner et al. 1990a).

Table III-c. Special-Status Wildlife Known to Occur or With Potential to Occur at MCCWA

U.S. Fish & Wildlife Service (USFWS) / National Oceanic & Atmospheric Administrative (NOAA) Fisheries Service
E = Endangered T = Threatened CH = Critical Habitat Designation C = Candidate D = Delisted
BCC = Bird of Conservation Concern

U.S. Forest Service (USFS)
FSS = Forest Service Sensitive Species

U.S. Bureau of Land Management (BLM)
BLMS = BLM Sensitive Species

California Department of Fish and Game (CDFG)
E = Endangered T = Threatened FP = Fully Protected SSC = Species of Special Concern WL = Watch List

CALFED Multi-Species Conservation Strategy (MSCS)
R = Recovery: CALFED is expected to undertake all actions within the ERP ecological management zones and program scope necessary to recover the species so that its long-term survival in nature is assured.
r = Contribute to recovery: CALFED will make specific contributions to the species' recovery; however, CALFED actions will have a limited effect on the species in a limited portion of its range.
m = Maintain: CALFED will take actions to maintain the species by improving habitat conditions where practicable and by avoiding, minimizing, and compensating for any adverse effects. This designation is less rigorous than "contribute to recovery," and CALFED actions are expected to have minimal effects on the species.

WBWG = Western Bat Working Group
High = High Priority

SPECIES	STATUS			HABITAT	POTENTIAL FOR OCCURRENCE
	USFWS NOAA USFS	CDFG	CALFED MSCS WBWG		
INVERTEBRATES					
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		R	Occurs only in the Central Valley of California in association with blue elderberry (*Sambucus mexicana*).	Known to occur. Requisite elderberry habitat is found on the Cottonwood Creek Unit.
Vernal pool fairy shrimp *Branchinecta lynchi*	T		m	Typically inhabit vernal pools and seasonal wetlands <200 m^2 and <5 cm deep; may occur in larger, deeper pools.	Vernal swale habitat at BFW1 may provide suitable habitat.
Vernal pool tadpole shrimp *Lepidurus packardi*	E		m	Typically inhabit vernal pools and swales in the Sacramento Valley; clear to highly turbid water; commonly found in grass-bottomed swales in unplowed grasslands.	Vernal swale habitat at BFW1 may provide suitable habitat.
FISH					
Spring run Chinook salmon *Oncorhynchus tshawytscha*	T CH	T	R	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, tributaries.	Known to migrate up Cottonwood Creek to spawning grounds at higher elevations.
Fall and late-fall run Chinook salmon *Oncorhynchus tshawytscha*	FSS	SSC	R	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, tributaries.	Known to occur in low numbers in Cottonwood Creek watershed.
Central Valley steelhead *Oncorhynchus mykiss*	T CH	SSC	R	Requires cold, freshwater streams with suitable gravel for spawning.	Known to occur in low numbers in Cottonwood Creek watershed.

SPECIES	STATUS			HABITAT	POTENTIAL FOR OCCURRENCE
	USFWS NOAA USFS	CDFG	CALFED MSCS WBWG		
AMPHIBIANS					
California red-legged frog *Rana draytonii*	T	SSC	m	Prefers wetlands with extensive vegetation. Requires 11-20 weeks of permanent water for larval development.	Presumed extirpated in the Central Valley. Low potential due to high populations of predators in natural and artificial wetland habitats.
REPTILES					
Northern Pacific pond turtle *Actinemys (=Clemmys) marmorata*	FSS	SSC	m	Inhabits slow-moving streams, sloughs, ponds, irrigation and drainage ditches, adjacent uplands.	Observed east of Cottonwood Unit on Reading Island. Known to occur in suitable habitats throughout region.
BIRDS					
Greater white-fronted goose *Anser albifrons elgasi*		SSC		Winters in Central Valley; usually associated with extensive marshlands.	Observed at BFW2.
Redhead *Aythya americana*		SSC		Occurs year round in California though status varies regionally. Redheads usually nest in freshwater emergent wetlands where dense stands of cattails (*Typha* spp.) and tules (*Scirpus* spp.) are interspersed with areas of deep, open water.	Unlikely to occur.
Common loon *Gavia immer*		SSC		Primarily known as a winter visitor to California, common loons are fairly common along the entire coast and uncommon on large deep lakes in valleys and foothills throughout the state. There are historic records of common loons nesting near lakes east of Mt. Lassen in Shasta County.	Species observed nearby; however, no suitable nesting habitat.
American white pelican *Pelecanus erythrorhynchos*		SSC		Forages in open water. Individuals may be present year-round, but does not breed in the Central Valley.	Observed foraging at BFW1. No suitable nesting habitat.
Least bittern *Ixobrychus exilis*		SSC		Nests in freshwater and brackish marshes with dense, emergent vegetation.	Suitable habitat present on site.
White-tailed kite *Elanus leucurus*		FP	m	Nests in woodlands and isolated trees; forages in grasslands, shrublands, agricultural fields.	Known to occur. MCCWA provides suitable foraging and nesting habitat.
Bald eagle *Haliaeetus leucocephalus*	D BCC	E FP	m	Forages primarily in fish-bearing waters, but also in open terrestrial habitats.	Known to occur. Documented nesting territory along Cottonwood Creek.
Northern harrier *Circus cyanus*		SSC	m	Nests and forages in open habitats including marshes, grasslands, shrublands, agricultural fields.	Known to nest and forage in suitable open habitats throughout the site.
Swainson's hawk *Buteo swainsoni*	BCC FSS	T	r	Nests in riparian woodlands and isolated trees; forages in grass-lands, shrublands, agricultural fields.	Potential nesting habitat is available.

SPECIES	STATUS			HABITAT	POTENTIAL FOR OCCURRENCE
	USFWS NOAA USFS	CDFG	CALFED MSCS WBWG		
BIRDS					
Ferruginous hawk *Buteo regalis*	BCC			A winter resident of the Central Valley, ferruginous hawks are usually found in open grassland areas. There are no nesting records in Central California.	Unlikely to occur based upon habitat preferences.
Golden eagle *Aquila chrysaetos*		FP WL		Habitat typically includes rolling foothills, mountain areas, sage-juniper flats, desert. Nests on cliffs of all heights and in large trees in open areas.	Unlikely to occur: No suitable nesting habitat nearby.
American peregrine falcon *Falco peregrinus anatum*	D BCC FSS	E FP	m	Usually nests on cliffs within foraging distance of water. Forages on birds, primarily waterfowl and shorebirds.	Observed hunting waterfowl on BFW1 in December 2006, but no suitable nesting habitat nearby.
Greater sandhill crane *Grus canadensis tabida*	FSS	T FP	r	Winter visitor to the Central Valley. Forages primarily in moist croplands with rice or corn stubble; also frequents grasslands, emergent wetlands.	Observed during migration. Shasta Valley is nearest nesting in Shasta County.
Black Tern *Chlidonias niger*		SSC		Flooded rice fields and freshwater marshes including lakes and ponds with emergent vegetation.	Out of known range of suitable nesting habitat.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C BCC FSS	E	r	Neotropical migrant. In California, tends to nest in dense riparian corridors with cottonwood trees and willows.	Unlikely due to low population numbers, but potential nesting habitat at Cottonwood Creek Unit.
Long-eared owl *Asio otus* (nesting)		SSC		Prefers thickly wooded riparian areas for nesting and roosting with nearby open spaces for hunting.	Unlikely to occur: Outside of known breeding range.
Short-eared owl *Asio flammeus* (nesting)		SSC		Nests and roosts on the ground in open meadows and grasslands.	Unlikely to occur: No suitable nesting habitat
Black swift *Cypseloides niger*	BCC	SSC		Nests behind or beside permanent or semi-permanent waterfalls, on perpendicular cliffs near water (above Sierran rivers or on the sea coast), and in sea caves.	No suitable nesting habitat near the Wildlife Area
Vaux's swift *Chaetura vauxi*		SSC		Often found foraging over lakes and ponds near the coast. Communal roosts are often in chimneys during migration especially in areas lacking suitable hollow snags. Migrating swifts can be found flying over a range of habitats from grasslands, desert scrub and chaparral to mature coniferous forests. Nests in hollow burned-out tree trunks in large conifers.	Observed during migration in the Wildlife Area. No suitable nesting or roosting habitat in the Wildlife Area.
Olive-sided flycatcher *Contopus cooperi*	BCC	SSC		Summer resident and migrant from April to October. Nests in coniferous forests throughout California.	Unlikely to occur: No suitable nesting habitat.

SPECIES	STATUS			HABITAT	POTENTIAL FOR OCCURRENCE
	USFWS NOAA USFS	CDFG	CALFED MSCS WBWG		
BIRDS					
Willow flycatcher *Empidonax traillii*	FSS BCC	E	r	Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.	Potential habitat on site, but low likelihood of occurrence.
Loggerhead shrike *Lanius ludovicianus*	BCC	SSC		Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	Known to occur. Suitable habitat present.
Purple martin *Progne subis*		SSC		Usually occurs in riparian forests, oak woodlands and montane forests. Requires large trees with cavities for nesting.	Unlikely, but has potential to occur based upon habitat and other cavity nesting species.
Bank swallow *Riparia riparia*		T	r	Nests in vertical banks and cliffs with fine textured or sandy soils near streams, rivers, lakes, ocean. Forages primarily over water.	Several known colonies along the Sacramento River corridor; may use Cottonwood Creek for foraging.
California yellow warbler *Dendroica petechia brewsteri*	BCC	SSC	r	Nests in riparian woodland and riparian scrub habitats. Forages in a variety of wooded and shrub habitats during migration.	Likely to occur. Suitable habitat is present.
Yellow-breasted chat *Icteria virens*		SSC	m	Nests in thick shrub habitats, including blackberry thickets. Associated with riparian and wetland habitats.	Observed at BFW1. Likely to occur throughout area.
Grasshopper sparrow *Ammodramus savannarum*		SSC		Summer resident in California. Found in open, primarily treeless, grassland habitats.	Unlikely to occur: No suitable open habitat.
Tricolored blackbird *Agelaius tricolor*	BCC BLMS	SSC	m	Nests colonially in tules, cattails, willows, thistles, blackberries, other dense vegetation. Forages in grasslands, agricultural fields.	Known to occur in general vicinity of MCCWA. Both Balls Ferry Wetland Units provide suitable nesting habitat.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*		SSC		Summer resident in California. Closely associated with freshwater emergent marshy areas with tall emergent vegetation.	Suitable nesting habitat is present.
MAMMALS					
Pallid bat *Antrozous pallidus*	FSS BLMS	SSC	WBWG: High	Particularly associated with oak and coniferous habitats in northern and central California. Day roosts include rock outcrops, mines, hollow trees, buildings and bridges.	Suitable habitat present at MCCWA.
Ringtail *Bassariscus astustus*		FP	m	Riparian woodlands and corridors throughout California.	Likely to occur.

Taxonomic order and scientific names for invertebrates and fish follow the CNDDB 2009. For birds, names follow the AOU Check list of North American Birds 1999 (with updates through 2008). Amphibian and reptile taxonomy follows CalHerps (2009). Mammal taxonomy follows the Smithsonian Institution's National Museum of Natural History (2009). Taxonomic order and scientific names are constantly updated; please consult with most recently published lists.